

MA327C(03)-1

Current Industrial Reports

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SUMMARY OF FINDINGS. In 2003, total manufacturers' shipments of refractories amounted to \$1,736.0 million, a decrease of 4.2 percent, from \$1,811.9 million in 2002.

Shipments of clay refractories decreased 0.4 percent to \$815.0 million in 2003, from \$818.7 million in 2002. Clay refractories shipments

accounted for 46.9 percent of total refractories shipments in 2003 and 45.2 percent in 2002. Shipments of nonclay refractories decreased 7.3 percent to \$921.0 million in 2003, from \$993.2 million in 2002. Nonclay refractories shipments accounted for 53.1 percent of the total refractories shipments in 2003 and 54.8 percent in 2002.

Brick and shapes continue to be the dominate form of refractories. Brick and shapes from clay refractories showed a decrease of 2.7 percent to \$402.5 million in 2003, from \$413.6 million in 2002. Brick and shapes from nonclay refractories showed a decrease of 11.3 percent to \$482.4 million in 2003, from \$544.1 million in 2002. Unshaped clay refractories increased 4.4 percent to \$348.3 million in 2003, from \$333.7 million in 2002. Plastic refractories and ramming mixes from nonclay refractories decreased 5.8 percent to \$110.3 million in 2003, from \$117.1 million in 2002.

For general CIR information, explanation of general terms and historical note, see the appendix.

Address inquiries concerning these data to Primary Goods Industries Branch, Manufacturing and Construction Division (MCD), Washington, DC 20233-6900, or call Theresa Crowley, 301-763-4840.

For mail or fax copies of this publication, please contact the Information Services Center, MCD, Washington, DC 20233-6900, or call 301-763-4673.

U S C E N S U S B U R E A U

Helping You Make Informed Decisions

U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU

Table 1. Value of Shipments of Refractories: 1998 to 2003
 [Value in thousands of dollars]

Year	Total	Clay	Nonclay
2003.....	1,735,998	814,965	921,033
2002.....	1,811,877	818,688	r/ 993,189
2001.....	1,875,003	774,219	1,100,784
2000.....	2,063,680	878,310	1,185,370
1999.....	2,229,358	918,738	1,310,620
1998.....	2,380,480	1,023,210	1,357,270

r/Revised by 5 percent or more from previously published data.

Table 2a. Quantity and Value of Shipments of Refractories by Type: 2003
 [Value in thousands of dollars]

Product code	Product description	No. of cos.	Quantity shipped (unit of measure)		M bricks (1,000 9-inch equivalent)	Value of shipments
			Short tons	Metric tons		
	Clay and nonclay refractories.....	(X)	(X)	(X)	(X)	1,735,998
327124	Clay refractories.....	(X)	(X)	(X)	(X)	814,965
	Brick and shapes.....	(X)	652,601	591,660	210,126	402,468
3271240111	Fireclay, including semi-silica, bloating and superduty fireclay brick and shapes, fireclay and high alumina pouring pit refractories, clay kiln furniture, radiant heater elements, and other miscellaneous clay refractory shapes.....	23	261,942	237,481	80,306	116,211
3271240211	High alumina brick and shapes containing 50 percent alumina and over, including glass house pots, tank blocks, feeder parts, and upper structure shapes, made predominately of calcined bauxite, kyanite, andalusite, and similar raw materials 1/.....	28	357,834	324,419	100,587	247,605
3271240411	Insulating brick and shapes.....	11	32,825	29,760	29,233	38,652
	Unshaped clay refractories.....	(X)	667,555	605,218	(X)	348,317
3271240421	Refractory bonding mortars, wet and dry, including clay and high alumina.....	29	143,969	130,525	(X)	69,538
3271240431	Plastic refractories and ramming mixes less than 50 percent alumina, high alumina plastic refractories and ramming mixes 50 percent and over, and high alumina phosphate bonded plastic and ramming mixes 50 percent alumina and over 2/.....	26	140,731	127,589	(X)	81,057
3271240311	Castable refractories less than 50 percent alumina, high alumina castables 50 percent and over, and insulating castables (hydraulic setting) density up to 105 lbs/cubic foot 3/.....	32	289,901	262,830	(X)	163,669
3271240441	Fireclay gunning mixes, including hydraulic setting gunning mixes, less than 50 percent alumina, high alumina gunning mixes, 50 percent alumina and over, and insulating gunning mixes (hydraulic setting).....	23	92,954	84,274	(X)	34,053
	Other refractory raw materials and refractory materials sold in lump or ground form either for direct use by customer as a finished refractory product or as exported exported material.....	(X)	194,703	176,521	(X)	43,126
3271240451	Clay and high alumina refractory raw materials 4/.....	11	(D)	(D)	(D)	(D)
3271240461	Clay and high alumina refractory materials 5/.....	9	(D)	(D)	(D)	(D)
3271240000	Clay refractories, n.s.k. 6/.....	(X)	(X)	(X)	(X)	21,054
327125	Nonclay refractories.....	(X)	(X)	(X)	(X)	921,033
	Brick and shapes.....	(X)	344,016	311,891	83,473	482,393
3271250111	All silica bricks and shapes, excluding semi-silica.....	10	7,167	6,498	2,532	13,214

Table 2a. Quantity and Value of Shipments of Refractories by Type: 2003
 [Value in thousands of dollars]

Product code	Product description	No. of cos.	Quantity shipped (unit of measure)		M bricks (1,000 9-inch equivalent)	Value of shipments
			Short tons	Metric tons		
3271250121	Magnesite-carbon brick and shapes, both less than 7 percent carbon, 7 percent carbon and over, predominately pitch and resin bonded, and carbon magnesite brick.....	4	102,294	92,742	16,592	56,567
3271250131	Magnesite brick and shapes, burned and unburned.....	5	(D)	(D)	(D)	(D)
3271250141	Magnesite-chrome, chrome-magnesite, including high fires, burned and unburned brick, and chrome brick.....	3	(D)	(D)	(D)	(D)
3271250151	Silicon carbide brick and shapes made predominately of silicon carbide, including kiln furniture.....	11	(D)	(D)	(D)	(D)
3271250161	Extra high alumina brick and shapes containing 87.5 percent alumina and higher, and extra high alumina pouring pit refractories, including sleeves, nozzles, runners, tuyeres, ladle gate parts, and mullite brick and shapes.....	22	26,672	24,181	11,126	92,174
3271250171	Zircon and zirconia brick and shapes made predominately of either of these materials, including electrocast.....	15	17,566	15,926	14,309	108,750
3271250181	All other brick and shapes, including dolomite, dolomite magnesite, forsterite, pyrophyllite-zircon, carbon and graphite crucibles, retorts, stopper heads, natural graphite refractories, and molten cast.....	19	(D)	(D)	(D)	(D)
	Mortars.....	(X)	(D)	(D)	(X)	(D)
3271250211	Unshaped nonclay refractories basic bonding mortars made predominately of magnesite or chrome ore, dolomite, and other nonclay mortars, made predominately of forsterite, zircon, and silica.....	10	(D)	(D)	(X)	(D)
3271250216	Extra high alumina refractory mortars made predominately of fused or synthetic alumina and mullite.....	11	3,162	2,867	(X)	3,523
	Plastic refractories and ramming mixes.....	(X)	166,678	151,113	(X)	110,255
3271250221	Basic castable mixes, including chrome, chrome-magnesia, magnesia-chrome, magnesia, and dolomite.....	8	(D)	(D)	(X)	(D)
3271250226	Extra high alumina plastic refractories and ramming mixes, 87.5 percent alumina and higher (made predominately of fused or synthetic aluminas and mullites), and extra high alumina phosphate bonded plastics and ramming mixes.....	17	30,449	27,606	(X)	33,713
3271250241	Extra high alumina castables and gunning mixes.....	12	10,847	9,834	(X)	9,118
3271250236	Other nonclay plastic refractories and ramming mixes.....	12	(D)	(D)	(X)	(D)
3271250231	Other nonclay refractory castables and plastics.....	6	(D)	(D)	(X)	(D)

Continued

Table 2a. Quantity and Value of Shipments of Refractories by Type: 2003
 [Value in thousands of dollars]

Product code	Product description	No. of cos.	Quantity shipped (unit of measure)		M bricks (1,000 9-inch equivalent)	Value of shipments
			Short tons	Metric tons		
3271250246	Gunning mixes: Basic nonclay gunning mixes, including chrome, chrome-magnesia, magnesia-chrome, magnesia, and dolomite and other nonclay gunning mixes.....	8	(D)	(D)	(X)	(D)
3271250251	Ceramic refractory fibers, 1,500 degrees F and higher.....	6	31,545	28,599	7,853	82,312
3271250256	Other nonclay refractory materials in lump or ground form, including ground silica.....	(X)	281,554	255,262	(X)	108,519
3271250261	Domestic shipments for direct use by customers as a finished refractory and all exported material 5/.....	13	95,794	86,849	(X)	46,523
3271250000	All other domestic shipments of nonclay refractory materials sold in lump or ground form as refractory raw material 4/.....	8	185,760	168,413	(X)	61,996
327992	Nonclay refractories, n.s.k. 6/.....	(X)	(X)	(X)	(X)	24,426
3279920331	Dead-burned magnesia or magnesite.....	(X)	136,748	123,978	(X)	60,032
3279920336	Domestic shipments for direct use as finished refractory products and all exported material 5/.....	6	(D)	(D)	(X)	(D)
3274100311	All other domestic shipments predominately for use as a refractory raw material.....	6	(D)	(D)	(X)	(D)
	Dead-burned dolomite.....	1	(D)	(D)	(X)	(D)

D Withheld to avoid disclosing data for individual companies. n.s.k. Not specified by kind. X Not applicable.

1/Includes high alumina pouring pit refractories (containing 50 percent alumina and over), sleeves, nozzles, runners, and ladle gate parts. Excludes data for mullite and extra-high alumina refractories. These products are included in the nonclay refractories section.

2/Includes products referred to as plastic firebrick and the less plastic materials intended for ramming into place after the addition of water (when shipped in dry form).

3/Includes hydraulic setting castables designed for low thermal conductivity and having bulk densities as defined in ASTM classification C-401, not greater than 105 pounds/cubic foot.

4/Includes shipments to refractory producers for reprocessing in the manufacture of brick and other refractories.

5/Includes shipments for direct use as finished refractory products by establishments classified in manufacturing industries and excludes shipments to refractory producers for reprocessing in the manufacture of brick and other refractories. Includes all exports.

6/Not specified by kind (n.s.k.) represents the value of shipments for establishments which did not report detailed information and establishments, typically with less than five employees, which were not included on the MA327C mailing panel.

Table 2b. Quantity and Value of Shipments of Refractories by Type: 2002
 [Value in thousands of dollars]

Product code	Product description	No. of cos.	Quantity shipped (unit of measure)		M bricks (1,000 9-inch equivalent)	Value of shipments
			Short tons	Metric tons		
327124	Clay and nonclay refractories.....	(X)	(X)	(X)	(X)	1,811,877
	Clay refractories.....	(X)	(X)	(X)	(X)	818,688
3271240111	Brick and shapes.....	(X)	689,291	624,924	235,392	413,630
	Fireclay, including semi-silica, bloating and superduty fireclay brick and shapes, fireclay and high alumina pouring pit refractories, clay kiln furniture, radiant heater elements, and other miscellaneous clay refractory shapes.....	22	297,527	269,743	90,319 r/	120,624
3271240211	High alumina brick and shapes containing 50 percent alumina and over, including glass house pots, tank blocks, feeder parts, and upper structure shapes, made predominately of calcined bauxite, kyanite, andalusite, and similar raw materials 1/.....	30	360,092	326,466	116,123	255,911
3271240411	Insulating brick and shapes.....	11	31,673	28,715	28,950	37,095
3271240421	Unshaped clay refractories.....	(X)	657,906	596,470	(X)	333,679
3271240431	Refractory bonding mortars, wet and dry, including clay and high alumina.....	30	141,943	128,688	(X)	61,867
	Plastic refractories and ramming mixes less than 50 percent alumina, high alumina plastic refractories and ramming mixes 50 percent and over, and high alumina phosphate bonded plastic and ramming mixes 50 percent alumina and over 2/.....	26	126,628	114,803	(X)	70,350
3271240311	Castable refractories less than 50 percent alumina, high alumina castables 50 percent and over, and insulating castables (hydraulic setting) density up to 105 lbs/cubic foot 3/.....	32	291,515	264,293	(X)	166,876
3271240441	Fireclay gunning mixes, including hydraulic setting gunning mixes, less than 505 alumina, high alumina gunning mixes, 50 percent alumina and over, and insulating gunning mixes (hydraulic setting).....	25	97,821	88,686	(X)	34,586
	Other refractory raw materials and refractory materials sold in lump or ground form either for direct use by customer as a finished refractory product or as exported exported material.....	(X)	170,485	154,565	(X)	50,238
3271240451	Clay and high alumina refractory raw materials 4/.....	11	(D)	(D)	(D)	(D)
3271240461	Clay and high alumina refractory materials 5/.....	9	(D)	(D)	(D)	(D)
3271240000	Clay refractories, n.s.k. 6/.....	(X)	(X)	(X)	(X)	21,141
327125	Nonclay refractories.....	(X)	(X)	(X)	(X) r/	993,189
	Brick and shapes.....	(X) r/	348,846 r/	316,270 r/	87,526 r/	544,114
3271250111	All silica bricks and shapes, excluding semi-silica.....	11	6,472	5,868	2,505	10,294
3271250121	Magnesite-carbon brick and shapes, both less than 7 percent carbon, 7 percent carbon and over, predominately pitch and resin bonded, and carbon magnesite brick.....	4 r/	103,221 r/	93,582 r/	16,178 r/	71,678
3271250131	Magnesite brick and shapes, burned and unburned.....	5	(D)	(D)	(D)	(D)

Continued

Table 2b. Quantity and Value of Shipments of Refractories by Type: 2002
 [Value in thousands of dollars]

Product code	Product description	No. of cos.	Quantity shipped (unit of measure)		M bricks (1,000 9-inch equivalent)	Value of shipments
			Short tons	Metric tons		
3271250141	Magnesite-chrome, chrome-magnesite, including high fires, burned and unburned brick, and chrome brick.....	3	(D)	(D)	(D)	(D)
3271250151	Silicon carbide brick and shapes made predominately of silicon carbide, including kiln furniture.....	11	(D)	(D)	(D)	(D)
3271250161	Extra high alumina brick and shapes containing 87.5 percent alumina and higher, and extra high alumina pouring pit refractories, including sleeves, nozzles, runners, tuyeres, ladle gate parts, and mullite brick and shapes.....	23	32,593	29,549	(S)	122,742
3271250171	Zircon and zirconia brick and shapes made predominately of either of these materials, including electrocast.....	17 r/	18,794 r/	17,039	13,385 r/	100,722
3271250181	All other brick and shapes, including dolomite, dolomite magnesite, forsterite, pyrophyllite-zircon, carbon and graphite crucibles, retorts, stopper heads, natural graphite refractories, and molten cast.....	19 (X)	(D) 92,960	(D) 84,279	(D) (X)	(D) 29,611
3271250211	Mortars.....	(X)	92,960	84,279	(X)	29,611
3271250211	Unshaped nonclay refractories basic bonding mortars made predominately of magnesite or chrome ore, dolomite, and other nonclay mortars, made predominately of forsterite, zircon, and silica.....	11	(D)	(D)	(D)	(D)
3271250216	Extra high alumina refractory mortars made predominately of fused or synthetic alumina and mullite.....	11 (X)	(D) 162,604	(D) 147,420	(D) (X) r/	(D) 117,058
3271250221	Plastic refractories and ramming mixes.....	(X)	162,604	147,420	(X) r/	117,058
3271250221	Basic castable mixes, including chrome, chrome-magnesia, magnesia-chrome, magnesia, and dolomite.....	9	(D)	(D)	(X)	(D)
3271250226	Extra high alumina plastic refractories and ramming mixes, 87.5 percent alumina and higher (made predominately of fused or synthetic aluminas and mullites), and extra high alumina phosphate bonded plastics and ramming mixes.....	18	35,206	31,918	(X) r/	38,784
3271250241	Extra high alumina castables and gunning mixes.....	11	5,064	4,591	(X)	4,931
3271250236	Other nonclay plastic refractories and ramming mixes.....	11	(D)	(D)	(X)	(D)
3271250231	Other nonclay refractory castables and plastics.....	5	(D)	(D)	(X)	(D)
3271250246	Gunning mixes: Basic nonclay gunning mixes, including chrome, chrome-magnesia, magnesia-chrome, magnesia, and dolomite and other nonclay gunning mixes.....	9	(D)	(D)	(X)	(D)
3271250251	Ceramic refractory fibers, 1,500 degrees F and higher.....	7	32,823	29,758	8,504	85,269
3271250256	Other nonclay refractory materials in lump or ground form, including ground silica.....	(X)	281,351	255,078	(X)	107,071
3271250256	Domestic shipments for direct use by customers as a finished refractory and all exported material 5/.....	12	(D)	(D)	(X)	(D)
3271250261	All other domestic shipments of nonclay refractory materials sold in lump or ground form as refractory raw material 4/.....	7	(D)	(D)	(X)	(D)
3271250000	Nonclay refractories, n.s.k. 6/.....	(X)	(X)	(X)	(X)	26,293

Continued

Table 2b. Quantity and Value of Shipments of Refractories by Type: 2002
 [Value in thousands of dollars]

Product code	Product description	No. of cos.	Quantity shipped (unit of measure)		M bricks (1,000 9-inch equivalent)	Value of shipments
			Short tons	Metric tons		
327992	Dead-burned magnesia or magnesite.....	(X)	285,309	258,666	(X)	88,039
3279920331	Domestic shipments for direct use as finished refractory products and all exported material 5/.....	9	117,669	106,681	(X)	34,722
3279920336	All other domestic shipments predominately for use as a refractory raw material.....	6 r/	167,639 r/	151,985	(X)	53,317
3274100311	Dead-burned dolomite.....	2	(D)	(D)	(X)	(D)

D Withheld to avoid disclosing data for individual companies. n.s.k. Not Specified by kind. r/Revised by 5 percent or more from previously published data. S Does not meet publication standards. X Not applicable.

1/Includes high alumina pouring pit refractories (containing 50 percent alumina and over), sleeves, nozzles, runners, and ladle gate parts. Excludes data for mullite and extra-high alumina refractories. These products are included in the nonclay refractories section.

2/Includes products referred to as plastic firebrick and the less plastic materials intended for ramming into place after the addition of water (when shipped in dry form).

3/Includes hydraulic setting castables designed for low thermal conductivity and having bulk densities as defined in ASTM classification C-401, not greater than 105 pounds/cubic foot.

4/Includes shipments to refractory producers for reprocessing in the manufacture of brick and other refractories.

5/Includes shipments for direct use as finished refractory products by establishments classified in manufacturing industries and excludes shipments to refractory producers for reprocessing in the manufacture of brick and other refractories. Includes all exports.

6/Not specified by kind (n.s.k.) represents the value of shipments for establishments which did not report detailed information and establishments, typically with less than five employees, which were not included on the MA327C mailing panel.

Table 3. Shipments, Exports, Imports, and Apparent Consumption of Refractories by Type: 2003 and 2002
 [Value in thousands of dollars]

Product code 1/	Product description	Manufacturers' shipments	Exports of domestic merchandise 1/ 2/ (value at port)	Percent exports to manufacturers' shipments	Imports for consumption 1/ 3/ (value at port) 4/	Apparent consumption 5/	Percent imports to apparent consumption
2003							
	Clay and nonclay refractories 6/.....	1,538,873	282,435	18.4	285,099	1,541,537	18.5
	Clay refractories.....	750,785	48,483	6.5	46,803	749,105	6.2
3271240111, 211, 411	Brick and shapes.....	402,468	36,954	9.2	45,109	410,623	11.0
3271240311, 421, 431, 441	Unshaped refractories and gunning mixes.....	348,317	11,529	3.3	1,694	338,482	0.5
	Nonclay refractories.....	788,088	233,952	29.7	238,296	792,432	30.1
3271250121, 131, 141	Nonclay magnesite and magnesite-chrome brick and shapes and chrome brick.....	77,465	50,295	64.9	115,284	142,454	80.9
3271250111, 151, 161, 171, 181	All other brick and shapes.....	404,928	78,412	19.4	97,727	424,243	23.0
3271250211, 216, 221, 226, 231, 236, 241, 246, 251	Unshaped nonclay refractories and gunning mixes.....	305,695	105,245	34.4	25,285	225,735	11.2
2002							
	Clay and nonclay refractories 6/..... r/	1,604,753	279,012	17.4	218,928 r/	1,544,669 r/	14.2
	Clay refractories.....	747,309	47,192	6.3	24,276	724,393	3.4
3271240111, 211, 411	Brick and shapes.....	413,630	37,458	9.1	23,165	399,337	5.8
3271240311, 421, 431, 441	Unshaped refractories and gunning mixes.....	333,679	9,734	2.9	1,111	325,056	0.3
	Nonclay refractories..... r/	859,825	231,820 r/	27.0	194,652 r/	822,657 r/	23.7
3271250121, 131, 141	Nonclay magnesite and magnesite-chrome brick and shapes and chrome brick..... r/	97,764	51,694 r/	52.9	91,423 r/	137,493 r/	66.5
3271250111, 151, 161, 171, 181	All other brick and shapes.....	446,350	82,327	18.4	75,659	439,682	17.2
3271250211, 216, 221, 226, 231, 236, 241, 246, 251	Unshaped nonclay refractories and gunning mixes..... r/	315,711	97,799 r/	31.0	27,570 r/	245,482 r/	11.2

r/ Revised by 5 percent or more from previously published data.

1/For comparison of North American Industry Classification System (NAICS)-based product codes with Schedule B export codes, and HTSUSA import codes, see Table 4.

2/Source: Census Bureau report EM 545, U.S. Exports.

3/Source: Census Bureau report IM 146, U.S. Imports for Consumption and General Imports.

4/"Value at port" includes both import value and duty value.

5/Apparent consumption is derived by subtracting exports from the total of shipments plus imports (including duty).

6/The "Clay and nonclay refractories" total shown here excludes product codes 3271240451, 3271240461, 3271240000, 3271250256, 3271250261, 3271250000, 3279920331, 3279920336, and 3274100311; therefore, they differ from the totals shown in Tables 1, 2a, and 2b.

Table 4. Comparison of North American Industry Classification System (NAICS)-Based Product Codes with Schedule B Export Codes, and HTSUSA Import Codes: 2003

Product code	Product description	Export code 1/	Import code 2/
3271240111, 211, 411	Clay brick and shapes.....	6902.20.1010 6902.20.5010 6902.90.1010 6902.90.5010 6903.90.0010	6902.20.1010 6902.20.5010 6902.90.1010 6902.90.5010 6903.90.0010
3271240311, 421, 431, 441	Unshaped clay refractories and gunning mixes.....	3816.00.0010	3816.00.0010
3271250121, 131, 141	Nonclay magnesite and magnesite-chrome brick and shapes, and chrome brick	6902.10.1000 6902.10.5000	6902.10.1000 6902.10.5000
3271250111, 151, 161, 171, 181	All other nonclay brick and shapes.....	6902.20.5020 6902.90.1020 6902.90.5020 6903.90.0050	6902.20.5020 6902.90.1020 6902.90.5020 6903.90.0050
3271250211, 216, 221, 226, 231, 236, 241, 246, 251	Unshaped nonclay refractories and gunning mixes.....	3816.00.0050	3816.00.0050

1/Source: 2003 edition, Harmonized System-based Schedule B, Statistical Classification of Domestic and Foreign Commodities Exported from the United States.

2/Source: Harmonized Tariff Schedule of the United States, Annotated (2003).

Appendix.

General CIR Survey Information, Explanation of General Terms and Historical Note

GENERAL

The CIR program has been providing monthly, quarterly, and annual measures of industrial activity for many years. Since 1904, with its cotton and fats and oils surveys, the CIR program has formed an essential part of an integrated statistical system involving the quinquennial economic census, manufacturing sector, and the annual survey of manufactures. The CIR surveys, however, provide current statistics at a more detailed product level than either of the other two statistical programs.

The primary objective of the CIR program is to produce timely, accurate data on production and shipments of selected products. The data are used to satisfy economic policy needs and for market analysis, forecasting, and decision making in the private sector. The product-level data generated by these surveys are used extensively by individual firms, trade associations, and market analysts in planning or recommending marketing and legislative strategies, particularly if their industry is significantly affected by foreign trade. Although production and shipments information are the two most common data items collected, the CIR program collects other measures also such as inventories, orders, and consumption. These surveys measure manufacturing activity in important commodity areas such as textiles and apparel, chemicals, primary metals, computer and electronic components, industrial equipment, aerospace equipment, and consumer goods.

The CIR program uses a unified data collection, processing, and publication system. The U.S. Census Bureau updates the survey panels for most reports annually and reconciles the estimates to the results of the broader-based annual survey of manufactures and the economic census, manufacturing sector. The manufacturing sector provides a complete list of all producers of the products covered by the CIR program and serves as the primary source for CIR sampling. Where a small number of producers exist, CIR surveys cover all known producers of a product. However, when the number of producers is too large, cutoff and random sampling techniques are used. Surveys are continually reviewed and modified to provide the most up-to-date information on products produced. The CIR program includes a group of mandatory and voluntary surveys. Typically the monthly and quarterly surveys are conducted on a voluntary basis. Those companies that choose not to respond to the voluntary surveys are required to submit a mandatory annual counterpart corresponding to the more frequent survey.

NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM (NAICS), 1997

The adoption of the North American Industry Classification System (NAICS) in the 1997 Economic Census has had a major impact on the comparability of current and historic data. Approximately half of the industries in the manufacturing sector of NAICS do not have comparable industries in the Standard Industrial Classification (SIC) system that was used in the past.

While most of the change affecting the manufacturing sector was change within the sector, some industries left manufacturing and others came into manufacturing. Prominent among those that left manufacturing are logging and portions of publishing. Prominent among the industries that came into the manufacturing sector are bakeries, candy stores where candy is made on the premises, custom tailors, makers of custom draperies, and tire retreading. The net effect of the classification changes are such that if the 1997 value of shipments data for all manufacturers were tabulated on an SIC basis, it would be approximately 3 percent higher.

Listed below are the NAICS sectors:

- 21 Mining
- 22 Utilities
- 23 Construction
- 31-33 Manufacturing
- 42 Wholesale Trade
- 44-45 Retail Trade
- 48-49 Transportation and Warehousing
- 51 Information
- 52 Finance and Insurance
- 53 Real Estate and Rental and Leasing
- 54 Professional, Scientific, and Technical Services
- 55 Management of Companies and Enterprises
- 56 Administrative and Support and Waste Management and Remediation Services
- 61 Educational Services
- 62 Health Care and Social Assistance
- 71 Arts, Entertainment, and Recreation
- 72 Accommodation and Food Services
- 81 Other Services (except Public Administration)

(Not listed above are the Agriculture, Forestry, Fishing, and Hunting sector (NAICS 11), partially covered by the census of agriculture conducted by the U.S. Department of Agriculture, and the Public Administration sector (NAICS 92), covered by the census of governments conducted by the Census Bureau.)

The 20 NAICS sectors are subdivided into 96 subsectors (three-digit codes), 313 industry groups (four-digit codes), and, as implemented in the United States, 1170 industries (five- and six-digit codes).

FUNDING

The Census Bureau funds most of the surveys. However, a number of surveys are paid for either fully or partially by other Federal Government agencies or private trade associations. A few surveys are mandated, but all are authorized by Title 13 of the United States Code.

RELIABILITY OF DATA

Survey error may result from several sources including the inability to obtain information about all cases in the survey, response errors, definitional difficulties, differences in the interpretation of questions, mistakes in recording or coding the reported data, and other errors of collection, response, coverage, and estimation. These nonsampling errors also occur in complete censuses. Although no direct measurement of the biases due to these nonsampling errors has been obtained, precautionary steps were taken in all phases of the collection, processing, and tabulation of the data in an effort to minimize their influence.

A major source of bias in the published estimates is the imputing of data for nonrespondents, for late reporters, and for data that fail logic edits. Missing figures are imputed based on period-to-period movements shown by reporting firms. A figure is considered to be an impute if the value was not directly reported on the questionnaire, directly derived from other reported items, directly available from supplemental sources, or obtained from the respondent during the analytical review phase. Imputation generally is limited to a maximum of 10 percent for any one data cell. Figures with imputation rates greater than 10 percent are suppressed or 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 range of difference between the actual and imputed figures is assumed to be small. The degree of uncertainty regarding the accuracy of the published data increases as the percentage of imputation increases. Figures with imputation rates above 10 percent should be used with caution.

DATA REVISIONS

Statistics for previous years may be revised as the result of corrected figures from respondents, late reports for which imputations were originally made, or other corrections. Data that have been revised by more than 5 percent from previously published data are indicated by footnotes.

DISCLOSURE

The Census Bureau collects the CIR data under the authority of Title 13, United States Code, which specifies that the information can only be used for statistical purposes and cannot be published or released in any manner that would identify a person, household, or establishment. "D" indicates that data in the cell have been suppressed to avoid disclosure of information pertaining to individual companies.

EXPLANATION OF GENERAL TERMS

Capacity. The maximum quantity of a product that can be produced in a plant in 1 day if operating for 24 hours. Includes the capacity of idle plants until the plant is reported to be destroyed, dismantled, or abandoned.

Consumption. Materials used in producing or processing a product or otherwise removing the product from the inventory.

Exports. Includes all types of products shipped to foreign countries, or to agents or exporters for reshipment to foreign countries.

Gross shipments. The quantity or value of physical shipments from domestic establishments of all products sold, transferred to other establishments of the same company, or shipped on consignment, whether for domestic or export sale or use. Shipments of products purchased for resale are omitted. Shipments of products made under toll arrangements are included.

Interplant transfers. Shipments to other domestic plants within a company for further assembly, fabrication, or manufacture.

Inventories. The quantity or value of finished goods, work in progress, and materials on hand.

Machinery in place. The number of machines of a particular type in place as of a particular date whether the machinery was used for production, prototype, or sampling, or was idle. Machinery in place includes all machinery set up in operating positions.

Net receipts. Derived by subtracting the materials held at the end of the previous month from the sum of materials used during the current month.

Production. The total volume of products produced, including: products sold; products transferred or added to inventory after adjustments for breakage, shrinkage, and obsolescence, plus any other inventory adjustment; and products that undergo further manufacture at the same establishment.

Quantities produced and consumed. Quantities of each type of product produced by a company for internal consumption within that same company.

Quantity and value of new orders. The sales value of orders received during the current reporting period for products and services to be delivered immediately or at some future date. Also represents the net sales value of contract change documents that increase or decrease the sales value of the orders to which they are related, when the parties concerned are in substantial agreement as to the amount involved. Included as orders are only those that are supported by binding legal documents such as signed contracts or letter contracts.

Quantity and value of shipments. The figures on quantity and value of shipments represent physical shipments of all products sold, transferred to other establishments of the same company, or shipped on consignment, whether for domestic or export sale. The value represents the net sales price, f.o.b. plant, to the customer or branch to which the products are shipped, net of discounts, allowances, freight charges, and

returns. Shipments to a company's own branches are assigned the same value as comparable appropriate allocation of company overhead and profit. Products bought and resold without further manufacture are excluded.

Stocks. Total quantity of ending finished inventory.

Unfilled orders (backlog). Calculated by adding net new orders and subtracting net sales from the backlog at the end of the preceding year.

HISTORICAL NOTE

Data on refractories have been collected by the Census Bureau since 1947. Historical data may be obtained from Current Industrial Reports (called Facts for Industry before 1959) available at your local Federal Depository Library.