

*(Formerly Series No. MA32C)*

Information about the scope of the survey, methodology, explanation of terms and historical notes for this survey may be found in the introduction of the 1997 Manufacturing Profiles, issued August 1999.

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These data are also available through the U.S. Department of Commerce and STAT-USA Electronic Bulletin Board by subscription. To access, dial 202-482-3870 and follow the prompts to register. Also, you may call 202-482-1986 or 1-800-STAT-USA, for further information. The Internet address is: [www.stat-usa.gov/](http://www.stat-usa.gov/).

NOTE: Data are now published on the new North American Industry Classification System (NAICS) basis and therefore are not always comparable to the old Standard Industrial Classification (SIC) code. For further information on NAICS, see [www.census.gov/epcd/www/naics.html](http://www.census.gov/epcd/www/naics.html).

## SUMMARY OF FINDINGS

In 1998, total manufacturers' shipments of refractories amounted to \$2,319.8 million, a decrease of 7 percent, from \$2,538.8 million in 1997.

Shipments of clay refractories decreased 5 percent to \$1,024.8 million in 1998, from \$1,084.2 million in 1997. Clay refractories shipments accounted for 44 percent of total refractories shipments in 1998 and 43 percent in 1997.

Shipments of nonclay refractories decreased 9 percent to \$1,354.4 million in 1998, from \$1,481.6 million in 1997. Nonclay refractories shipments accounted for 57 percent of the total refractories shipments in 1998 and 58 percent in 1997.

Brick and shapes continue to be the dominate form of refractories, showing a decrease of 8 percent to \$571.0 million in 1998, from \$621.5 million in 1997. Unshaped clay refractories decreased 2 percent to \$398.8 million in 1998, from \$406.3 million in 1997. Mortars decreased 14 percent to \$26.9 million in 1998, from \$31.3 million in 1997. Plastic refractories and ramming mixes increased 13 percent to \$182.8 million in 1998, from \$161.3 million in 1997.

## Current Industrial Reports

Address inquiries concerning these data to Primary Goods Industries Branch, Manufacturing and Construction Division (MCD), Washington, DC 20233-6900, or call Evelyn Jordan, 301-457-4788.

For mail or fax copies of this publication, please contact the Information Services Center, MCD, Washington, DC 20233-6900, or call 301-457-4673.



**Table 1. Value of Shipments of Refractories: 1988 to 1998**  
**[Thousands of dollars]**

<b>Year</b>		<b>Total</b>		<b>Clay</b>	<b>Nonclay</b>
<b>1998 .....</b>		<b>2,379,189</b>		<b>1,024,789</b>	<b>1,354,400</b>
<b>1997.....</b>	<b>r/</b>	<b>2,565,817</b>	<b>r/</b>	<b>1,084,179</b>	<b>1,481,638</b>
<b>1996.....</b>		<b>2,340,757</b>		<b>930,006</b>	<b>1,410,751</b>
<b>1995.....</b>		<b>2,222,384</b>		<b>940,835</b>	<b>1,281,549</b>
<b>1994.....</b>		<b>2,046,979</b>		<b>906,165</b>	<b>1,140,814</b>
<b>1993.....</b>		<b>1,930,233</b>		<b>772,986</b>	<b>1,157,247</b>
<b>1992.....</b>		<b>1,956,083</b>		<b>786,078</b>	<b>1,170,005</b>
<b>1991.....</b>		<b>1,946,842</b>		<b>784,331</b>	<b>1,162,511</b>
<b>1990.....</b>		<b>2,002,833</b>		<b>771,315</b>	<b>1,231,518</b>
<b>1989.....</b>		<b>2,010,947</b>		<b>823,266</b>	<b>1,187,681</b>
<b>1988.....</b>		<b>1,950,032</b>		<b>813,739</b>	<b>1,136,293</b>

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

Table 2a. Quantity and Value of Shipments of Refractories by Type: 1998  
[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)	2,379,189
	Clay refractories.....	(X)	(X)	(X)	(X)	1,024,789
3271240111	Brick and shapes.....	(X)	1,012,857	918,275	337,800	570,997
	Fireclay, including semisilica, 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.....	32	547,637	496,498	155,036	211,580
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/.....	31	414,200	375,521	145,585	300,364
3271240411	Insulating brick and shapes.....	14	51,020	46,256	37,179	59,053
3271240421	Unshaped clay refractories.....	(X)	837,945	759,696	(X)	398,800
3271240431	Refractory bonding mortars, wet and dry, including clay and high alumina.....	36	133,630	121,151	(X)	60,702
	Plastic refractories and ramming mixes, less than 50 percent alumina; high alumina plastic refractories and ramming mixes 50 percent alumina and over; and high alumina phosphate bonded plastic refractories and ramming mixes 50 percent alumina and over 2/.....	29	170,460	154,542	(X)	80,037
3271240311	Castable refractories less than 50 percent alumina; high alumina castables 50 percent alumina and over; and insulating castables (hydraulic setting), density up to 105 pounds/cubic foot 3/.....	36	364,053	330,057	(X)	193,270
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).....	31	169,802	153,946	(X)	64,791
	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 material.....	(X)	174,258	157,986	(X)	25,993
3271240451	Clay and high alumina refractory raw materials 4/.....	18	165,569	150,108	(X)	23,705
3271240461	Clay and high alumina refractory materials 5/.....	10	8,689	7,878	(X)	2,288
3271240000	Clay refractories n.s.k. 6/.....	(X)	(X)	(X)	(X)	28,999
327125	Nonclay refractories.....	(X)	(X)	(X)	(X)	1,354,400
	Brick and shapes.....	(X)	477,397	432,817	106,052	720,999
3271250111	All silica bricks and shapes, excluding semisilica.....	15	26,250	23,799	12,667	55,296
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.....	9	109,232	99,032	20,392	110,660
3271250131	Magnesite brick and shapes, burned and unburned.....	10	37,328	33,842	6,887	33,404
3271250141	Magnesite-chrome, chrome-magnesite, including high fires, burned and unburned brick, and chrome brick.....	5	53,798	48,774	11,312	53,423

Continued

Table 2a. Quantity and Value of Shipments of Refractories by Type: 1998  
[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		
3271250151	Silicon-carbide brick and shapes (made predominately of silicon carbide), including kiln furniture.....	14	15,966	14,475	4,237	79,001
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.....	29	41,850	37,942	8,503	117,210
3271250171	Zircon and zirconia brick and shapes (made predominately of either of these materials, including electrocast).....	15	8,828	8,004	4,437	62,758
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.....	18	184,145	166,949	37,617	209,247
3271250211	Mortars.....	(X)	75,238	68,212	(X)	26,893
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)	(X)	19,186
3271250216	Extra-high alumina refractory mortars (made predominately of fused or synthetic alumina and mullite).....	19	(D)	(D)	(X)	7,707
3271250221	Plastic refractories and ramming mixes.....	(X)	163,002	147,781	(X)	182,769
3271250221	Basic castable mixes, including chrome, chrome-magnesia, magnesia-chrome, magnesia, and dolomite.....	13	89,388	81,041	(X)	64,834
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 refractories and ramming mixes.....	22	62,178	56,372	(X)	72,685
3271250241	Extra-high alumina castables and gunning mixes.....	10	11,436	10,368	(X)	14,475
3271250236	Other nonclay plastic refractories and ramming mixes.....	12	(D)	(D)	(X)	12,986
3271250231	Other nonclay refractory castables and plastics refractories.....	13	(D)	(D)	(X)	17,789
3271250246	Gunning mixes: Basic nonclay gunning mixes, including chrome, chrome-magnesia, magnesia-chrome, magnesia, and dolomite and other nonclay gunning mixes.....	16	248,184	225,008	(X)	96,436
3271250251	Ceramic refractory fibers, 1500 degrees F and higher.....	17	39,604	35,906	20,265	137,984
3271250256	Other nonclay refractory materials sold in lump or ground form, including ground silica.....	(X)	407,178	369,155	(X)	151,335
3271250261	Domestic shipments for direct use by customers as a finished refractory and all exported material 5/.....	11	207,066	187,730	(X)	93,637
3271250261	All other domestic shipments of nonclay refractory materials sold in lump or ground form as a refractory raw material 4/.....	9	200,112	181,425	(X)	57,698
3271250000	Nonclay refractories n.s.k. 6/.....	(X)	(X)	(X)	(X)	37,984
327992	Dead-burned magnesia or magnesite.....	(X)	(D)	(D)	(X)	(D)

Continued

Table 2a. Quantity and Value of Shipments of Refractories by Type: 1998  
[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		
3279920331	Domestic shipments for direct use as finished refractory products and all exported material 5/.....	4	(D)	(D)	(X)	(D)
3279920336	All other domestic shipments predominately for use as a refractory raw material.....	10	(D)	(D)	(X)	(D)
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. 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, that were not included on the MA327C mailing panel.

Table 2b. Quantity and Value of Shipments of Refractories by Type: 1997  
[Value in thousands of dollars]

			Quantity shipped (unit of measure)						
Product code	Product description	No. of cos.	Short tons		Metric tons		M bricks (1,000 9-inch equivalent)		Value of shipments
327124	Clay and nonclay refractories.....	(X)		(X)		(X)		(X)	r/ 2,565,817
	Clay refractories.....	(X)		(X)		(X)		(X)	r/ 1,084,179
	Brick and shapes.....	(X)	r/ 1,120,931	r/ 1,016,257	r/ 340,967	r/ 621,458			
3271240111	Fireclay, including semisilica, 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.....	32	r/ 574,692	r/ 521,026	r/ 170,656	r/ 231,257			
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/.....	34	r/ 488,113	r/ 442,532	r/ 130,102			327,802	
3271240411	Insulating brick and shapes.....	14	r/ 58,127	r/ 52,699		40,209	r/ 62,399		
3271240421	Unshaped clay refractories.....	(X)	r/ 899,792	r/ 815,768		(X)	r/ 406,334		
3271240421	Refractory bonding mortars, wet and dry, including clay and high alumina.....	35	r/ 148,038	r/ 134,214		(X)	r/ 63,485		
3271240431	Plastic refractories and ramming mixes, less than 50 percent alumina; high alumina plastic refractories and ramming mixes 50 percent alumina and over; and high alumina phosphate bonded plastic refractories and ramming mixes 50 percent alumina and over 2/.....	28	r/ 188,526	r/ 170,921		(X)	r/ 91,501		
3271240311	Castable refractories less than 50 percent alumina; high alumina castables 50 percent alumina and over; and insulating castables (hydraulic setting), density up to 105 pounds/cubic foot 3/.....	38	r/ 385,262	r/ 349,286		(X)		188,222	
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).....	31	r/ 177,966	r/ 161,347		(X)		63,126	
	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 material.....	(X)		205,361		186,184		(X) 28,402	
3271240451	Clay and high alumina refractory raw materials 4/.....	18		195,501		177,245		(X) 26,080	
3271240461	Clay and high alumina refractory materials 5/.....	10		9,860		8,939		(X) 2,322	
3271240000	Clay refractories n.s.k. 6/.....	(X)		(X)		(X)		(X) 27,985	
327125	Nonclay refractories.....	(X)		(X)		(X)		(X) 1,481,638	
	Brick and shapes.....	(X)		511,889		464,089	r/ 118,571		818,079
3271250111	All silica bricks and shapes, excluding semisilica.....	15		43,615		39,542		20,473	67,385
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.....	8		110,839		100,489		20,721	115,450
3271250131	Magnesite brick and shapes, burned and unburned.....	10		31,699		28,739		5,820	r/ 28,623
3271250141	Magnesite-chrome, chrome-magnesite, including high fires, burned and unburned brick, and chrome brick.....	5		57,927		52,518		10,475	59,701

Continued

Table 2b. Quantity and Value of Shipments of Refractories by Type: 1997  
[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			
3271250151	Silicon-carbide brick and shapes (made predominately of silicon carbide), including kiln furniture.....	14		20,013		18,144	4,711	84,177
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.....	29	r/	42,518	r/	38,548	9,693	148,769
3271250171	Zircon and zirconia brick and shapes (made predominately of either of these materials, including electrocast).....	15		9,728		8,820	r/	65,765
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.....	18		195,550		177,289	r/	248,209
3271250211	Mortars.....	(X)	r/	99,884	r/	90,557	(X)	31,295
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)	(X)	22,630
3271250216	Extra-high alumina refractory mortars (made predominately of fused or synthetic alumina and mullite).....	19		(D)		(D)	(X)	8,665
3271250221	Plastic refractories and ramming mixes.....	(X)		175,894		198,488	(X)	187,047
3271250221	Basic castable mixes, including chrome, chrome-magnesia, magnesia-chrome, magnesia, and dolomite.....	13	r/	92,468	r/	83,833	(X)	61,369
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 refractories and ramming mixes.....	10	r/	65,024	r/	58,952	(X)	76,331
3271250241	Extra-high alumina castables and gunning mixes.....	13		11,942		10,827	(X)	15,697
3271250236	Other nonclay plastic refractories and ramming mixes.....	13		(D)		(D)	(X)	13,973
3271250231	Other nonclay refractory castables and plastics refractories.....	13		(D)		(D)	(X)	19,677
3271250246	Gunning mixes: Basic nonclay gunning mixes, including chrome, chrome-magnesia, magnesia-chrome, magnesia, and dolomite and other nonclay gunning mixes.....	16		270,115		244,891	(X)	101,662
3271250251	Ceramic refractory fibers, 1500 degrees F and higher.....	12		45,393		41,154	(X)	137,846
3271250256	Other nonclay refractory materials sold in lump or ground form, including ground silica.....	(X)		460,369		417,379	(X)	166,516
3271250261	Domestic shipments for direct use by customers as a finished refractory and all exported material 5/.....	21		236,103		214,055	(X)	99,586
3271250261	All other domestic shipments of nonclay refractory materials sold in lump or ground form as a refractory raw material 4/.....	10		224,266		203,324	(X)	66,930
3271250000	Nonclay refractories n.s.k. 6/.....	(X)		(X)		(X)	(X)	39,193
327992	Dead-burned magnesia or magnesite.....	(X)		(D)		(D)	(X)	(D)

Continued

Table 2b. Quantity and Value of Shipments of Refractories by Type: 1997  
[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		
3279920331	Domestic shipments for direct use as finished refractory products and all exported material 5/.....	6	(D)	(D)	(X)	(D)
3279920336	All other domestic shipments predominately for use as a refractory raw material.....	8	(D)	(D)	(X)	(D)
3274100311	Dead-burned dolomite.....	3	(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. 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, that were not included on the MA327C mailing panel.



Table 3a. Shipments, Exports, Imports, and Apparent Consumption of Refractories by Type: 1998  
[Value in thousands of dollars]

Product code 1/	Product description	Unit of measure	Manufacturers' shipments		Exports of domestic merchandise 1/ 2/		Percent exports to manufacturers' shipments	
			Quantity	Value	Quantity	Value at port	Quantity	Value
	Clay and nonclay refractories 3/.....	(X)	(X)	2,379,189	(X)	338,639	(X)	14.0
	Clay refractories.....	(X)	(X)	1,024,789	(X)	59,712	(X)	6.0
3271240111, 211, 411	Brick and shapes.....	1,000 standard brick equivalent....	337,800	570,997	(NA)	46,600	(NA)	8.0
3271240421, 431, 311, 441	Unshaped clay refractories and gunning mixes.....	Metric tons.....	759,696	398,800	11,960	13,112	2.0	3.0
	Nonclay refractories.....	(X)	(X)	1,354,400	(X)	278,927	(X)	21.0
3271250121, 131, 141	Nonclay magnesite and magnesite-chrome brick and shapes and chrome brick.....	1,000 standard brick equivalent....	38,591	197,487	(NA)	59,055	(NA)	30.0
3271250111, 151, 161, 171, 181	All other brick and shapes.....	1,000 standard brick equivalent....	67,461	523,512	(NA)	112,125	(NA)	21.0
3271250211, 216, 221, 226, 241, 231, 236, 246, 251	Unshaped nonclay refractories and gunning mixes.....	Metric tons.....	661,302	626,851	149,202	107,747	23.0	17.0
			Imports for consumption 1/ 4/		Apparent consumption 6/		Percent imports to apparent consumption	
			Quantity	Value 5/	Quantity	Value	Quantity	Value
	Clay and nonclay refractories 3/.....	(X)	(X)	256,023	(X)	2,296,573	(X)	11.1
	Clay refractories.....	(X)	(X)	30,929	(X)	996,006	(X)	3.1
3271240111, 211, 411	Brick and shapes.....	1,000 standard brick equivalent....	(NA)	29,296	(NA)	553,693	(NA)	5.3
3271240421, 431, 311, 441	Unshaped clay refractories and gunning mixes.....	Metric tons.....	1,309	1,633	749,045	387,321	0.2	0.4
	Nonclay refractories.....	(X)	(X)	225,094	(X)	1,300,567	(X)	17.3
3271250121, 131, 141	Nonclay magnesite and magnesite-chrome brick and shapes and chrome brick.....	1,000 standard brick equivalent....	(NA)	92,088	(NA)	230,520	(NA)	39.9
3271250111, 151, 161, 171, 181	All other brick and shapes.....	1,000 standard brick equivalent....	(NA)	106,936	(NA)	518,323	(NA)	20.6
3271250211, 216, 221, 226, 241, 231, 236, 246, 251	Unshaped nonclay refractories and gunning mixes.....	Metric tons.....	51,158	26,070	563,258	545,174	9.1	4.8

NA Not available. X Not applicable.

1/For comparison of North American Industry Classification System-Based codes with Schedule B export numbers and HTSUSA import numbers, see Table 4.

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

3/The "Clay and nonclay refractories" total shown here excludes product codes 327124 0451, 327124 0461, 327124 0000, 327125 0256, 327125 0261, 327125 0000, 327992 0331, 327992 0336, 327410 0311; therefore, they differ from the totals shown in Tables 1 and 2a.

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

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

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

Table 3b. Shipments, Exports, Imports, and Apparent Consumption of Refractories by Type: 1997  
[Value in thousands of dollars]

Product code 1/	Product description	Unit of measure	Manufacturers' shipments		Exports of domestic merchandise 1/ 2/		Percent exports to manufacturers' shipments	
			Quantity	Value	Quantity	Value at port	Quantity	Value
	Clay and nonclay refractories 3/.....	(X)	(X)	2,565,817	(X)	369,093	(X)	14.0
	Clay refractories.....	(X)	(X)	1,084,179	(X)	81,185	(X)	7.0
3271240111, 211, 411	Brick and shapes.....	1,000 standard brick equivalent..	340,967	621,458	(NA)	68,040	(NA)	11.0
3271240421, 431, 311, 441	Unshaped clay refractories and gunning mixes.....	Metric tons.....	815,768	406,344	13,362	13,145	2.0	3.0
	Nonclay refractories.....	(X)	(X)	1,481,638	(X)	287,908	(X)	19.0
3271250121, 131, 141	Nonclay magnesite and magnesite-chrome brick and shapes and chrome brick.....	1,000 standard brick equivalent..	37,016	203,774	(NA)	70,967	(NA)	35.0
3271250111, 151, 161, 171, 181	All other brick and shapes.....	1,000 standard brick equivalent..	81,555	614,305	(NA)	100,890	(NA)	16.0
3271250211, 216, 221, 226, 241, 231, 236, 246, 251	Unshaped nonclay refractories and gunning mixes.....	Metric tons.....	751,997	644,897	160,190	116,051	21.0	18.0
			Imports for consumption 1/ 4/		Apparent consumption 6/		Percent imports to apparent consumption	
			Quantity	Value 5/	Quantity	Value	Quantity	Value
	Clay and nonclay refractories 3/.....	(X)	(X)	278,962	(X)	2,475,686	(X)	11.3
	Clay refractories.....	(X)	(X)	30,616	(X)	1,033,610	(X)	3.0
3271240111, 211, 411	Brick and shapes.....	1,000 standard brick equivalent..	(NA)	29,450	(NA)	582,868	(NA)	5.1
3271240421, 431, 311, 441	Unshaped clay refractories and gunning mixes.....	Metric tons.....	1,078	1,166	803,484	394,365	0.1	0.3
	Nonclay refractories.....	(X)	(X)	248,346	(X)	1,442,076	(X)	17.2
3271250121, 131, 141	Nonclay magnesite and magnesite-chrome brick and shapes and chrome brick.....	1,000 standard brick equivalent..	(NA)	95,364	(NA)	228,171	(NA)	41.8
3271250111, 151, 161, 171, 181	All other brick and shapes.....	1,000 standard brick equivalent..	(NA)	127,476	(NA)	640,891	(NA)	19.9
3271250211, 216, 221, 226, 241, 231, 236, 246, 251	Unshaped nonclay refractories and gunning mixes.....	Metric tons.....	40,881	25,506	632,688	554,352	6.5	4.6

NA Not available. X Not applicable.

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

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

3/The "Clay and nonclay refractories" total shown here excludes product codes 327124 0451, 327124 0461, 327124 0000, 327125 0256, 327125 0261, 327125 0000, 327992 0331, 327992 0336, 327410 0311; therefore, they differ from the totals shown in Tables 1 and 2a.

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

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

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

**Table 4. Comparison of North American Industry Classification System-Based Product Codes with Schedule B Export Numbers, and HTSUSA Import Numbers: 1998**

<b>Product code</b>	<b>Product description</b>	<b>Export number 1/</b>	<b>Import number 2/</b>
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
3271240421, 431, 311, 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.....	6902.20.1020 6902.20.5020 6902.90.1020 6902.90.5020 6903.90.0050	6902.20.1020 6902.20.5020 6902.90.1020 6902.90.5020 6903.90.0050
3271250211, 216, 221, 226, 241, 231, 236, 246, 251	Unshaped nonclay refractories and gunning mixes.....	3816.00.0050	3816.00.0050

1/Source: 1998 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 (1998).