

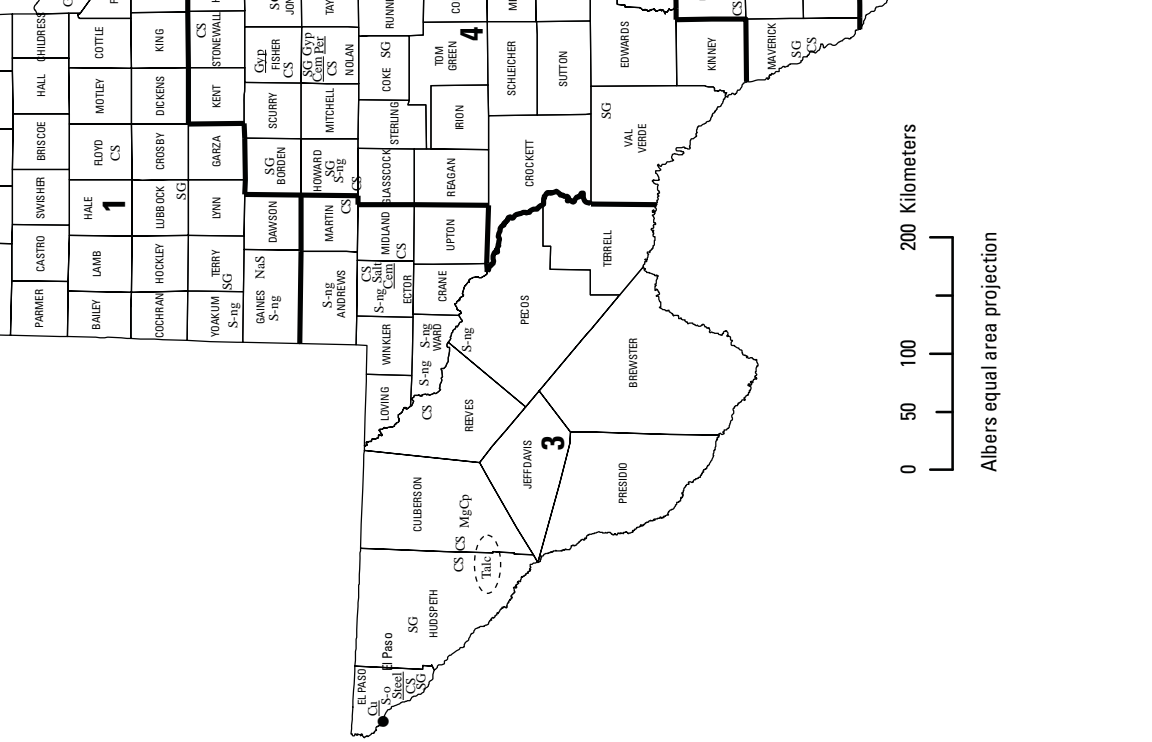


2006 Minerals Yearbook

TEXAS

TEXAS

DALLAM	SHERMAN	HAUSFORD	DECHILTREE	UPSCOMB
HARTLEY	S-HE MOORE	HUTCHINSON	ROBERTS	HMPHILL
ODHAM	POTTER	CARSON	GRAY	WHEELER
DEAFSMITH	BRANDALL	ARMSTRONG	DONLEY	CLUNGSVORH
PARMER	CASTRO	SWISHER	BRISCOE	HALL
BAILEY	LAMB	HALE	FLOYD	MOTLEY
COCHRAN	HOCKEY	LUBBOCK	GROSBY	DICKENS
YOAKUM	TERRY	DWY	GARZA	KENT
GAINES	NLS	DANFORD	HOWARD	MITCHELL
ANDREWS	MARTIN	HOWARD	HOWARD	MITCHELL
LOWING	WINKLER	WINKLER	WINKLER	WINKLER
CULBERSON	JEFF DAVIS	JEFF DAVIS	JEFF DAVIS	JEFF DAVIS
EL PASO	EL PASO	EL PASO	EL PASO	EL PASO



LEGEND

- County boundary
- ★ Capital
- City
- 1— Crushed stone/sand and gravel district boundary

MINERAL SYMBOLS (Major producing areas)

- Al Aluminum plant
- BC Ball clay
- Bent Bentonite
- Cem Cement plant
- Clay Common clay
- CS Crushed stone
- Cu Copper plant
- D-G Dimension granite
- D-L Dimension limestone
- Ful Fuller's earth
- Gyp Gypsum
- Gyp Gypsum plant
- He Helium
- IS Industrial sand
- Ka Kaolin
- Lime Lime plant
- MgCp Magnesium compounds
- Per Perlite plant
- S-ng Sulfur (natural gas)
- S-o Sulfur (oil)
- Salt Salt
- NaS Sodium sulfate
- Steel Steel plant
- Talc Talc
- Ver Vermiculite plant
- Zeo Zeolites
- (Dashed circle) Concentration of mineral operations

THE MINERAL INDUSTRY OF TEXAS

This chapter has been prepared under a Memorandum of Understanding between the U.S. Geological Survey and the University of Texas at Austin, Bureau of Economic Geology, for collecting information on all nonfuel minerals.

In 2006, Texas nonfuel raw mineral production¹ was valued at \$2.98 billion, based upon annual U.S. Geological Survey (USGS) data. This was a 9.6% increase from the State's total nonfuel mineral value of \$2.72 billion for 2005, which followed a \$390 million, or 16.7%, increase from 2004 to 2005. Texas was seventh among the 50 States (sixth in 2005) in total nonfuel mineral production value and accounted for about 4.5% of the U.S. total value.

In 2006, more than 96% of Texas' nonfuel mineral value resulted from the production of the State's top six industrial minerals, which are, in descending order of value—cement (portland and masonry), crushed stone, construction sand and gravel, salt, lime, and industrial sand and gravel. Cement alone accounted for about 38% of Texas' total nonfuel mineral value and together with the State's other two major construction nonfuel minerals, crushed stone and construction sand and gravel, accounted for more than 85% of the same total value. Nearly every one of the State's nonfuel mineral commodities increased in total production value in 2006. Leading the way with the largest increases in value were construction sand and gravel, up by \$131 million, and cement, up by about \$121 million (portland cement alone, up by \$119 million). A 23% increase in construction sand and gravel production along with a modest increase in the mineral commodity's average unit value resulted in a 28% increase in its total production value. The total production value of cement rose by about 12%, despite a more than 2.5% decrease in the quantity produced. Other mineral commodities that had increases in production and total value were lime, value up by \$18 million; Grade-A helium, up by more than \$14 million; and salt, up by \$14 million (production down slightly). Smaller increases of \$1 million or more, in descending order of change, took place in the values of crushed stone, common clays, bentonite clay, and crude helium. The most substantial decrease in value took place in that of industrial sand and gravel. A \$48 million decrease in its total production value was the result of a 46% decrease in production. Also down slightly were the production and resultant values of brucite and zeolites (table 1).

In 2006, Texas was the only State that produced brucite, and it continued to be first in rank among producing States in the quantities of crushed stone and common clays produced; second in the production of salt, crude helium (of two producing States), ball clay, and talc (listed in descending order of value); fifth in lime; and seventh in masonry cement. The State rose

¹The terms "nonfuel mineral production" and related "values" encompass variations in meaning, depending upon the mineral products. Production may be measured by mine shipments, mineral commodity sales, or marketable production (including consumption by producers) as is applicable to the individual mineral commodity.

All 2006 USGS mineral production data published in this chapter are those available as of March 2008. All USGS Mineral Industry Surveys and USGS Minerals Yearbook chapters—mineral commodity, State, and country—can be retrieved over the Internet at URL <http://minerals.usgs.gov/minerals>.

in rank to first from second in the production of portland cement, to second from third in construction sand and gravel, to second from third in zeolites, to sixth from seventh each in crude gypsum and bentonite clay. Also, Texas was a significant producer of gemstones, being 14th in rank based upon value). Decreases took place in the State ranking in the production of industrial sand and gravel, to 7th from 2d, and in dimension stone, to 13th from 7th. The Texas metal industry produced primary aluminum, raw steel, refined copper, and smaller amounts of other metals. Sources of plant feed included ores, blister and anode copper, and scrap metal acquired from foreign or other domestic sources. In 2006, the State continued to be third in rank in primary aluminum production and was the leading producer of electrolytically refined copper. Texas also remained one of the Nation's leading raw steel-producing States (precise rank withheld—data combined with that of other States to conceal proprietary data). Production of raw steel increased by about 7.7% in 2006 with an output of 3.78 million metric tons (Mt), up from 3.51 Mt in 2005, as reported by the American Iron and Steel Institute (2007, p. 74).

The following narrative information includes information provided by the Texas Bureau of Economic Geology² (BEG). In 2006, the mineral industry, as was monitored by the BEG, remained a significant and diverse component of the Texas economy as evidenced by the increased production and values of most of the State's nonfuel minerals from those of 2005. Annual job growth in natural resources and mining, as reported by the Texas Workforce Commission (Texas Workforce Commission, 2007, p. 1), increased 6.9% from December 2005 through December 2006. This number includes mining and support services for nonfuel minerals as well as oil and gas extraction and coal mining. Steadily increasing gains were made in the growth of construction industry employment. The Commission reported an increase of about 7.7% in the number of construction industry jobs Statewide in 2006 compared with those of 2005, showing continued growth from the 3.2% increase of 2005 and the 1.2% increase during 2004 compared with those of the previous year.

Commodity Review

Industrial Minerals

Aggregate reserves continued to be acquired in 2006, with many companies investing capital in future or replacement reserves, but no major company mergers or acquisitions took place in the aggregate industry (Clift and Kyle, 2007, p. 114).

²Sigrid J. Clift, Research Associate, Texas Bureau of Economic Geology, and J. Richard Kyle, Professor, Department of Geological Sciences, both of the John A. and Katherine G. Jackson School of Geosciences, University of Texas at Austin, coauthored the text of the State mineral industry information provided by the Texas Bureau of Economic Geology.

Cement.—A joint-venture cement terminal project was completed and opened in Houston by Alamo Cement Co., Ash Grove Cement Co., and Texas Lehigh Cement Co., LP, and was managed under the partnership's company name Houston Cement Co. The port of Houston Cement Terminal, which included the preexisting terminal of North Texas Cement Co. (owned by Ash Grove Cement), was designed to import and distribute 1.5 million metric tons per year of cement and featured six 57 meter-high (186 foot-high) concrete silos and was the largest capacity cement ship unloader operating in the United States. Construction of the project was conducted through a partnership between River Management, Consulting and Engineering Services, Co. (project design and engineering) and Continental Construction Co. with the two developing an efficient facility layout in conjunction with engineers at Ash Grove (Amburgey, 2007, p. 1–2).

Frontier Materials Concrete opened a new facility along the San Jacinto River near Conroe in Montgomery County. Two of the State's cement companies announced plans to increase cement production—TXI (Texas Industries, Inc.) at its Hunter plant and CEMEX USA at its New Braunfels plant—both plants are located between Austin and San Antonio (Clift and Kyle, 2007, p. 114).

Sand and Gravel, Construction.—Vulcan Materials Co. opened a new sand and gravel plant on the Brazos River west of Houston in Fort Bend County. Trinity Materials Inc. opened a new sand and gravel facility in Kaufman County and another in Liberty County. In 2006, U.S. Concrete, Inc. acquired Breckenridge Ready-Mix, Inc., which it added to its existing Ingram Enterprises, Inc. operations in west Texas (U.S. Concrete, Inc., 2006). Near the end of 2005, U.S. Concrete acquired all the operating assets of Go-Crete and South Loop Development Corp., which produce and deliver ready-mixed concrete from six plants and mine sand and gravel from a quarry in the greater Dallas/Ft. Worth, TX, market (U.S. Concrete, Inc., 2005).

Stone, Crushed.—Rail shipments via “rocktimization” efforts of the railroads became more efficient and rock shortages in the Houston market decreased. Rocktimization, a trademark program of Union Pacific Railroad Corp., is a mined product-to-market program designed to produce valuable benefits in shipment sizes, network fluidity, and productivity in transporting aggregates for many customers. Through network investments and reduced train starts, it is designed to create a higher velocity of materials and shorter cycle time of material transported (Union Pacific Corp., 2009).

Lattimore Materials Co. LP closed its limestone crushing plant in Wise County, TX. Capital Aggregates Ltd. began an

expansion of crushed stone operations in Burnet County in a joint-venture project with ChemLime.

Reclamation Awards

The U.S. Department of the Interior's Office of Surface Mining (OSM) in its Reclamation Awards for 2006 recognized the Oak Hill Mine (TXU Mining Co.) in East Texas with the Directors Award and the Sandow Mine (Alcoa) the National Award. The Director's Award, the OSM's highest honor for a mining company, was given to TXU Mining for the company's commitment to outstanding innovative reclamation practices at Oak Hill (TXU Mining Co., 2006). Alcoa received the 2006 National Award for Excellence in Surface Mining for its land reclamation accomplishments at the Sandow Mine in Rockdale in central eastern Texas (Alcoa, Inc., 2006).

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TABLE 1
NONFUEL RAW MINERAL PRODUCTION IN TEXAS^{1,2}

(Thousand metric tons and thousand dollars)

Mineral	2004		2005		2006	
	Quantity	Value	Quantity	Value	Quantity	Value
Cement:						
Masonry	319	38,000 ^e	395	48,500 ^e	382	50,700 ^e
Portland	11,200	800,000 ^e	11,600	951,000 ^e	11,300	1,070,000 ^e
Clays:						
Ball	W	W	W	7,730	W	W
Bentonite	W	W	W	W	71	2,300
Common	2,160	8,890	2,340	8,680	2,360	12,600
Gemstones, natural	NA	201	NA	201	NA	202
Gypsum, crude	2,450	18,800	1,540	11,800	1,430	11,800
Lime	1,630	115,000	1,610	112,000	1,650	130,000
Salt	9,780 ^r	118,000	9,600	118,000	9,570	132,000
Sand and gravel:						
Construction	81,700	436,000	80,700	472,000	99,500	603,000
Industrial	2,790	109,000	2,840	114,000	1,530	65,600
Stone:						
Crushed	122,000	621,000	137,000 ^r	820,000 ^r	136,000	824,000
Dimension	64	15,200	44	12,200	31	12,600
Talc, crude	258	W	W	W	W	W
Combined values of brucite, clays (fuller's earth, kaolin) helium, zeolites, and values indicated by the symbol						
W	XX	46,300	XX	41,500 ^r	XX	68,200
Total	XX	2,330,000	XX	2,720,000	XX	2,980,000

^eEstimated. ^rRevised. NA Not available. W Withheld to avoid disclosing company proprietary data. Withheld values included in "Combined values" data. XX Not applicable.

¹Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

²Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 2
TEXAS: CRUSHED STONE SOLD OR USED, BY KIND¹

Kind	2005			2006		
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Number of quarries	Quantity (thousand metric tons)	Value (thousands)
Limestone ²	115 ^r	132,000 ^r	\$785,000 ^r	125	131,000	\$787,000
Dolomite	1	W	W	1	W	W
Calcareous Marl	1	21	125	2	1,160	7,170
Marble	4 ^r	122 ^r	1,620 ^r	4	148	1,970
Shell	(3)	W	W	(3)	W	W
Granite	2 ^r	W	W	2	W	W
Traprock	1	W	W	1	W	W
Sandstone and quartzite	4	857	7,420	4	708	5,480
Volcanic cinder and scoria	1	W	W	--	--	--
Miscellaneous stone	12 ^r	2,320 ^r	13,700 ^r	12	2,470	14,800
Total	XX	137,000 ^r	820,000 ^r	XX	136,000	824,000

^rRevised. W Withheld to avoid disclosing company proprietary data; included in "Total." XX Not applicable. -- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes limestone-dolomite reported with no distinction between the two.

³Sales/distribution yards.

TABLE 3
TEXAS: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2006, BY USE¹

(Thousand metric tons and thousand dollars)

Use	Quantity	Value
Construction:		
Coarse aggregate (+1½ inch):		
Riprap and jetty stone	327	2,860
Filter stone	410	3,050
Other coarse aggregate	1,590	23,100
Total	2,330	29,000
Coarse aggregate, graded:		
Concrete aggregate, coarse	5,780	39,200
Bituminous aggregate, coarse	3,020	21,600
Bituminous surface-treatment aggregate	143	1,270
Railroad ballast	W	W
Other graded coarse aggregate	8,560	81,500
Total	17,500	144,000
Fine aggregate (¾ inch):		
Stone sand, concrete	1,510	8,770
Stone sand, bituminous mix or seal	437	3,040
Screening, undesignated	1,230	3,110
Other fine aggregate	1,750	11,600
Total	4,930	26,500
Coarse and fine aggregates:		
Graded road base or subbase	10,300	45,400
Terrazzo and exposed aggregate	(2)	(2)
Crusher run or fill or waste	1,890	5,240
Other coarse and fine aggregates	11,100	64,100
Total	23,200	115,000
Other construction materials ³	216	1,700
Agricultural:		
Limestone	(4)	(4)
Poultry grit and mineral food	(4)	(4)
Other agricultural uses	8	79
Chemical and metallurgical:		
Cement manufacture	10,900	30,600
Lime manufacture	(4)	(4)
Sulfur oxide removal	(4)	(4)
Special:		
Asphalt fillers or extenders	(4)	(4)
Other fillers or extenders	987	11,600
Other miscellaneous uses and other specified uses not listed	9	104
Unspecified:⁵		
Reported	47,400	291,000
Estimated	27,000	160,000
Total	74,100	450,000
Grand total	136,000	824,000

W Withheld to avoid disclosing company proprietary data; included with "Other graded coarse aggregate."

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Withheld to avoid disclosing company proprietary data; included with "Other coarse and fine aggregates."

³Includes pipe bedding.

⁴Withheld to avoid disclosing company proprietary data; included in "Grand total."

⁵Reported and estimated production without a breakdown by end use.

TABLE 4
TEXAS: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2006, BY USE AND DISTRICT¹

(Thousand metric tons and thousand dollars)

Use	Districts 1 and 2 ²		Districts 3 and 4 ²		Districts 5 and 6 ²		Districts 7, 8, and 9 ²	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Construction:								
Coarse aggregate (+1½ inch) ³	--	--	W	W	W	W	1,950	26,000
Coarse aggregate, graded ⁴	223	2,650	1,910	15,800	1,520	13,900	13,800	111,000
Fine aggregate (¾ inch) ⁵	W	W	W	W	1,040	3,630	3,380	19,300
Coarse and fine aggregates ⁶	173	826	1,620	10,100	3,080	14,700	18,100	84,700
Other construction materials ⁷	--	--	194	1,560	--	--	22	132
Agricultural ⁸	W	W	--	--	W	W	W	W
Chemical and metallurgical ⁹	--	--	--	--	W	W	W	W
Special ¹⁰	--	--	--	--	W	W	W	W
Other miscellaneous uses	--	--	--	--	9	104	--	--
Unspecified: ¹¹								
Reported	--	--	633	3,910	20,500	125,000	26,300	162,000
Estimated	460	2,900	3,700	23,000	8,100	50,000	14,000	83,000
Total	909	6,540	8,640	58,500	44,300	253,000	81,900	500,000
	Unspecified districts							
	Quantity	Value						
Construction:								
Coarse aggregate (+1½ inch) ³	--	--						
Coarse aggregate, graded ⁴	23	461						
Fine aggregate (¾ inch) ⁵	--	--						
Coarse and fine aggregates ⁶	294	4,380						
Other construction materials ⁷	--	--						
Agricultural ⁸	--	--						
Chemical and metallurgical ⁹	--	--						
Special ¹⁰	--	--						
Other miscellaneous uses	--	--						
Unspecified: ¹¹								
Reported	--	--						
Estimated	--	--						
Total	317	4,840						

W Withheld to avoid disclosing company proprietary data; included in "Total." -- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Districts 1 and 2, 3 and 4, 5 and 6, and 7, 8, and 9 are combined to avoid disclosing company proprietary data.

³Includes filter stone, riprap and jetty stone, and other coarse aggregate.

⁴Includes bituminous aggregate (coarse), bituminous surface-treatment aggregate, concrete aggregate (coarse), railroad ballast, and other graded coarse aggregate.

⁵Includes screening (undesignated), stone sand (bituminous mix or seal), stone sand (concrete), and other fine aggregates.

⁶Includes crusher run or fill or waste, graded road base or subbase, terrazzo and exposed aggregate, and other coarse and fine aggregates.

⁷Includes pipe bedding.

⁸Includes agricultural limestone, poultry grit and mineral food, and other agricultural uses.

⁹Includes cement and lime manufacture and sulfur oxide removal.

¹⁰Includes asphalt fillers or extenders and other fillers or extenders.

¹¹Reported and estimated production without a breakdown by end use.

TABLE 5
TEXAS: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2006, BY MAJOR USE CATEGORY¹

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate (including concrete sand)	31,900	\$212,000	\$6.64
Concrete products (blocks, bricks, pipe, decorative, etc.) ²	1,160	7,100	6.14
Asphaltic concrete aggregates and other bituminous mixtures	883	7,330	8.31
Road base and coverings	3,830	19,700	5.16
Road and other stabilization (cement and lime)	1,090	8,900	8.17
Fill	5,690	15,900	2.79
Snow and ice control	14	75	5.36
Roofing granules	38	549	14.45
Other miscellaneous uses ³	144	1,990	13.82
Unspecified: ⁴			
Reported	16,100	98,100	6.11
Estimated	38,800	232,000	5.98
Total or average	99,500	603,000	6.06

¹Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.

²Includes plaster and gunite sands.

³Includes golf course.

⁴Reported and estimated production without a breakdown by end use.

TABLE 6
TEXAS: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2006, BY USE AND DISTRICT¹

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate and concrete products ²	887	8,800	2,030	12,800	W	W
Asphaltic concrete aggregates and road base materials ³	333	5,290	W	W	W	W
Fill	110	595	641	1,040	W	W
Other miscellaneous uses ⁴	--	--	124	587	721	4,630
Unspecified: ⁵						
Reported	72	467	--	--	2	14
Estimated	5,340	32,100	1,310	7,890	828	4,980
Total	6,740	47,200	4,110	22,300	1,550	9,620
Use	District 4		District 5		District 6	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate and concrete products ²	W	W	7,000	47,400	W	W
Asphaltic concrete aggregates and road base materials ³	--	--	1,150	6,930	W	W
Fill	W	W	2,020	5,800	W	W
Other miscellaneous uses ⁴	239	1,460	39	564	609	3,930
Unspecified: ⁵						
Reported	--	--	2,520	12,500	--	--
Estimated	1,950	11,700	11,500	68,100	1,870	11,200
Total	2,190	13,200	24,200	141,000	2,480	15,200
Use	District 7		District 8		District 9	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate and concrete products ²	3,900	25,800	14,200	83,600	W	W
Asphaltic concrete aggregates and road base materials ³	1,090	4,670	2,530	14,600	W	W
Fill	651	3,070	2,040	4,900	W	W
Other miscellaneous uses ⁴	61	254	41	1,350	4,280	34,800
Unspecified: ⁵						
Reported	4,680	31,300	8,470	51,800	--	--
Estimated	3,680	21,700	6,740	40,500	5,590	33,600
Total	14,100	86,900	34,000	197,000	9,860	68,300
Use	Unspecified districts					
	Quantity	Value				
Concrete aggregate and concrete products ²	--	--				
Asphaltic concrete aggregates and road base materials ³	--	--				
Fill	--	--				
Other miscellaneous uses ⁴	--	--				
Unspecified: ⁵						
Reported	314	2,040				
Estimated	--	--				
Total	314	2,040				

W Withheld to avoid disclosing company proprietary data; included in "Other miscellaneous uses." -- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes plaster and gunite sands.

³Includes road and other stabilization (cement and lime).

⁴Includes golf course, roofing granules, and snow and ice control.

⁵Reported and estimated production without a breakdown by end use.