

DIAMOND (INDUSTRIAL)

(Data in million carats unless otherwise noted)

Domestic Production and Use: In 2005, domestic production was estimated to be approximately 252 million carats, and the United States remained the world's leading market for industrial diamond. All domestic output was synthetic grit and powder. Two firms, one in Pennsylvania and the other in Ohio, accounted for all of the production. Nine firms produced polycrystalline diamond from diamond powder. Four companies recovered used industrial diamond as one of their principal operations. The following industry sectors were the major consumers of industrial diamond: computer chip production, construction, machinery manufacturing, mining services (drilling for mineral, oil, and gas exploration), stone cutting/polishing, and transportation systems (infrastructure and vehicles). Stone cutting and highway building and repair consumed most of the industrial stone. About 98% of the U.S. industrial diamond market now uses synthetic industrial diamond because its quality can be controlled and its properties can be customized to fit specific requirements.

Salient Statistics—United States:	<u>2001</u>	<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005^e</u>
Bort, grit, and dust and powder; natural and synthetic:					
Production:					
Manufactured diamond ^e	202	219	236	252	252
Secondary	10	5.7	4.7	4.6	4.6
Imports for consumption	281	185	250	240	289
Exports ¹	88	82	74	86	95
Sales from Government stockpile excesses	—	—	—	—	—
Consumption, apparent	405	328	417	411	451
Price, value of imports, dollars per carat	0.31	0.34	0.26	0.25	0.28
Net import reliance ² as a percentage of apparent consumption	48	31	42	38	43
Stones, natural:					
Production:					
Mine	(3)	—	—	—	—
Secondary	(3)	(3)	(3)	(3)	(3)
Imports for consumption ⁴	2.5	2.0	1.8	1.8	2.3
Exports ¹	1.0	1.1	0.3	0.5	—
Sales from Government stockpile excesses	0.5	0.4	0.4	0.4	—
Consumption, apparent	2.2	1.6	2.1	2.1	2.7
Price, value of imports, dollars per carat	3.54	5.43	3.09	7.77	12.55
Net import reliance ² as a percentage of apparent consumption	91	88	91	80	84

Recycling: In 2005, the amount of diamond bort, grit, and dust and powder recycled was estimated to be 4.58 million carats. Lower prices of newly produced industrial diamond appear to be reducing the number and scale of diamond stone recycling operations. In 2005, it was estimated that 424,000 carats of diamond stone were recycled.

Import Sources (2001-04): Bort, grit, and dust and powder; natural and synthetic: Ireland, 34%; China, 27%; Ukraine, 13%; Russia, 7%; and other, 19%. Stones, primarily natural: Ireland, 32%; Russia, 15%; Switzerland, 15%; Belgium, 8%; and other, 30%.

Tariff: Item	Number	Normal Trade Relations 12-31-05
Miners' diamond, carbonados	7102.21.1010	Free.
Other	7102.21.1020	Free.
Industrial diamond, natural advanced	7102.21.3000	Free.
Industrial diamond, natural not advanced	7102.21.4000	Free.
Industrial diamond, other	7102.29.0000	Free.
Grit or dust and powder	7105.10.0000	Free.

Depletion Allowance: 14% (Domestic and foreign).

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Government Stockpile:

Stockpile Status—9-30-05⁵

Material	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposal plan FY 2005	Disposals FY 2005
Industrial stones	0.520	—	0.520	0.400	—

Events, Trends, and Issues: The United States will continue to be the world's leading market for industrial diamond into the next decade and will remain a significant producer and exporter of industrial diamond as well. Increase in U.S. demand for industrial diamond is likely to continue in the construction sector as the United States builds and repairs the Nation's highway system. Industrial diamond coats the cutting edge of saws used to cut cement in highway construction and repair work. One U.S. company has developed a chemical vapor deposition (CVD) method of growing nearly 100%-pure diamond. One research group has developed a CVD method which is even faster and uses microwave plasma technology. The greatest potential for CVD diamond will be in computing, where it will be able to function as a semiconductor at much higher speeds and temperatures than silicon.

World demand for diamond grit and powder will continue growing. Demand for synthetic diamond grit and powder is expected to be greater than for natural diamond material. Constant-dollar prices of synthetic diamond products probably will continue to decline as production technology becomes more cost effective; the decline is even more likely if competition from low-cost producers in China and Russia continues increasing.

World Mine Production, Reserves, and Reserve Base:⁶

	Mine production		Reserves ⁷	Reserve base ⁷
	2004	2005 ^e		
United States	(3)	(3)	NA	NA
Australia	11.3	22.7	90	230
Botswana	7.8	7.5	130	225
China	1.0	0.1	10	20
Congo (Kinshasa)	22	22	150	350
Russia	14.2	10.4	40	65
South Africa	8.7	9	70	150
Other countries	<u>2</u>	<u>2</u>	<u>85</u>	<u>210</u>
World total (rounded)	67	74	580	1,250

World Resources: Natural diamond resources have been discovered in more than 35 countries. Natural diamond accounts for about 10% of all industrial diamond used, while synthetic diamond accounts for the remainder. At least 15 countries have the technology to produce synthetic diamond.

Substitutes: Materials that can compete with industrial diamond in some applications include manufactured abrasives, such as cubic boron nitride, fused aluminum oxide, and silicon carbide. Synthetic diamond rather than natural diamond is used for about 90% of industrial applications.

^eEstimated. NA Not available. — Zero.

¹Reexports no longer are combined with exports because increasing amounts of U.S. reexports obscure apparent consumption rates.

²Defined as imports – exports + adjustments for Government and industry stock changes.

³Less than ½ unit.

⁴May include synthetic miners' diamond.

⁵[See Appendix B for definitions.](#)

⁶Natural industrial diamond only. Note, however, that synthetic diamond production far exceeds natural industrial diamond output. Worldwide production of manufactured industrial diamond totaled at least 614 million carats in 2001; the leading producers included Ireland, Japan, Russia, and the United States.

⁷[See Appendix C for definitions.](#)