

**DIAMOND (INDUSTRIAL)**

(Data in million carats unless otherwise noted)

**Domestic Production and Use:** In 2007, domestic production of industrial diamond was estimated to be approximately 260 million carats, and the United States remained the world's leading market. 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 and polishing, and transportation systems (infrastructure and vehicles). Stone cutting and highway building and repair consumed most of the industrial stone. About 99% 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.

<b>Salient Statistics—United States:</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007<sup>e</sup></b>
Bort, grit, and dust and powder; natural and synthetic:					
Production:					
Manufactured diamond <sup>e</sup>	236	252	256	258	260
Secondary	4.7	4.6	4.6	34.2	34.3
Imports for consumption	250	240	284	371	423
Exports <sup>1</sup>	74	86	92	99	104
Sales from Government stockpile excesses	—	—	—	—	—
Consumption, apparent	417	411	453	564	613
Price, value of imports, dollars per carat	0.26	0.25	0.27	0.22	0.19
Net import reliance <sup>2</sup> as a percentage of apparent consumption	42	38	42	48	52
Stones, natural:					
Production:					
Mine	—	—	—	—	—
Secondary	( <sup>3</sup> )	( <sup>3</sup> )	0.53	0.56	0.43
Imports for consumption <sup>4</sup>	1.8	1.8	2.1	2.2	3.1
Exports <sup>1</sup>	( <sup>3</sup> )	0.5	( <sup>3</sup> )	1.6	—
Sales from Government stockpile excesses	0.4	0.4	—	0.1	( <sup>3</sup> )
Consumption, apparent	2.1	2.1	2.2	1.3	3.5
Price, value of imports, dollars per carat	3.09	7.77	13.91	12.61	10.83
Net import reliance <sup>2</sup> as a percentage of apparent consumption	91	80	77	57	88

**Recycling:** In 2007, the amount of diamond bort, grit, and dust and powder recycled was estimated to be 34.3 million carats. Lower prices of newly produced industrial diamond appear to be reducing the number and scale of diamond stone recycling operations. In 2007, it was estimated that 425,000 carats of diamond stone were recycled.

**Import Sources (2003-06):** Bort, grit, and dust and powder; natural and synthetic: China, 42%; Ireland, 29%; Russia, 7%; Ukraine, 7%; and other, 15%. Stones, primarily natural: Botswana, 23%; Ireland, 22%; Namibia, 10%; South Africa, 10%; and other, 35%.

<b>Tariff:</b>	<b>Item</b>	<b>Number</b>	<b>Normal Trade Relations</b>
			<b>12-31-07</b>
	Industrial Miners' diamonds, carbonados	7102.21.1010	Free.
	Industrial Miners' diamonds, other	7102.21.1020	Free.
	Industrial diamonds, simply sawn, cleaved, or bruted	7102.21.3000	Free.
	Industrial diamonds, not worked	7102.21.4000	Free.
	Industrial diamonds, other	7102.29.0000	Free.
	Grit or dust and powder of natural or synthetic diamonds	7105.10.0000	Free.

**Depletion Allowance:** 14% (Domestic and foreign).

## DIAMOND (INDUSTRIAL)

### Government Stockpile:

#### Stockpile Status—9-30-07<sup>5</sup>

Material	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposal plan FY 2007	Disposals FY 2007
Industrial stones	0.473	—	0.473	0.473	0.036

**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 remain 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:<sup>6</sup>

	Mine production		Reserves <sup>7</sup>	Reserve base <sup>7</sup>
	2006	2007 <sup>e</sup>		
United States	—	—	NA	NA
Australia	22	16	90	230
Botswana	8	8	130	230
China	1	1	10	20
Congo (Kinshasa)	22	23	150	350
Russia	15	15	40	65
South Africa	9	9	70	150
Other countries	<u>3</u>	<u>3</u>	<u>85</u>	<u>210</u>
World total (rounded)	80	75	580	1,300

**World Resources:** Natural diamond resources have been discovered in more than 35 countries. Natural diamond accounts for about 12% 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 88% of industrial applications.

<sup>e</sup>Estimated. NA Not available. — Zero.

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

<sup>2</sup>Defined as imports – exports + adjustments for Government and industry stock changes.

<sup>3</sup>Less than ½ unit.

<sup>4</sup>May include synthetic miners' diamond.

<sup>5</sup>[See Appendix B for definitions.](#)

<sup>6</sup>Natural industrial diamond only. Note, however, that synthetic diamond production far exceeds natural industrial diamond output. Worldwide production of manufactured industrial diamond totaled at least 568 million carats in 2007; the leading producers included Ireland, Japan, Russia, South Africa, and the United States.

<sup>7</sup>[See Appendix C for definitions.](#)