# GEMSTONES

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In this report, the terms "gem" and "gemstone" mean any mineral or organic material (such as amber, pearl, petrified wood, and shell) used for personal adornment, display, or object of art because it possesses beauty, durability, and rarity. Of more than 4,000 mineral species, only about 100 possess all these attributes and are considered to be gemstones. Silicates other than quartz are the largest group of gemstones; oxides and quartz are the second largest (table 1). Gemstones are subdivided into diamond and colored gemstones, which in this report designates all natural nondiamond gems. In addition, laboratory-created gemstones, cultured pearls, and gemstone simulants are discussed but are treated separately from natural gemstones (table 2). Trade data in this report are from the U.S. Census Bureau. All percentages in the report were computed using unrounded data. Current information on industrial-grade diamond and industrial-grade garnet can be found in the U.S. Geological Survey (USGS) Minerals Yearbook, volume I, Metals and Minerals, chapters on industrial diamond and industrial garnet.

In 2004, the estimated value of natural gemstones produced in the United States was $14.5 million, and the estimated value of U.S. laboratory-created gemstone production was $30.7 million. The total estimated value of U.S. gemstone production was $45.2 million. The estimated value of U.S. gemstone imports was $15.5 billion, and the value of combined U.S. gemstone exports and reexports was estimated to be $7.23 billion.

Gemstones have fascinated humans since prehistoric times. They have been valued as treasured objects throughout history by all societies in all parts of the world. Amber, amethyst, coral, diamond, emerald, garnet, jade, jasper, lapis lazuli, pearl, rock crystal, ruby, serpentine, and turquoise are some of the first stones known to have been used for making jewelry. These stones served as symbols of wealth and power. Today, gems are worn more for pleasure or in appreciation of their beauty than to demonstrate wealth. In addition to jewelry, gemstones are used for collections, decorative art objects, and exhibits.

### Production

Commercial mining of gemstones has never been extensive in the United States. More than 60 varieties of gemstones have been produced commercially from domestic mines, but most of the deposits have been relatively small compared with other mining operations. In the United States, much of the current gemstone mining is conducted by individual collectors, gem clubs, and hobbyists rather than by businesses.

The commercial gemstone industry in the United States consists of individuals and companies that mine gemstones or harvest shell and pearl, firms that manufacture laboratory-created gemstones, and individuals and companies that cut and polish natural and laboratory-created gemstones. The domestic gemstone industry is focused on the production of colored gemstones and on the cutting and polishing of large diamond stones. Industry employment is estimated to range from 1,000 to 1,500 workers (U.S. International Trade Commission, 1997, p. 1).

Most natural gemstone producers in the United States are small businesses that are widely dispersed and operate independently. The small producers probably have an average of less than three employees, including those who only work part time. The number of gemstone mines operating from year to year fluctuates because the uncertainty associated with the discovery and marketing of gem-quality minerals makes it difficult to obtain financing for developing and sustaining economically viable deposits (U.S. International Trade Commission, 1997, p. 23).

The total value of natural gemstones produced in the United States during 2004 was estimated to be at least $14.5 million (table 3). The production value increased by 15% from that of the preceding year.

The estimate of 2004 U.S. gemstone production was based on a survey of more than 230 domestic gemstone producers conducted by the USGS. The survey provided a foundation for projecting the scope and level of domestic gemstone production during the year. However, the USGS survey did not represent all gemstone activity in the United States, which includes thousands of professional and amateur collectors. Consequently, the USGS supplemented its survey with estimates of domestic gemstone production from related published data, contacts with gemstone dealers and collectors, and information garnered at gem and mineral shows.

Natural gemstone materials indigenous to the United States are collected, produced, and/or marketed in every State. During 2004, all 50 States produced at least $1,000 worth of gemstone materials. Seven States accounted for 79% of the total value, as reported by survey respondents. These States, in order of declining value of production, were Tennessee, Arizona, Oregon, California, Idaho, Montana, and Nevada. Some States were known for the production of a single gemstone material—Tennessee for freshwater pearls, for example. Other States produced a variety of gemstones, for example Arizona, whose gemstone deposits included agate, amethyst, azurite, chrysocolla, garnet, jade, jasper, malachite, obsidian, onyx, opal, peridot, petrified wood, smithsonite, and turquoise. There is also a wide variety of gemstones found and produced in California, Idaho, Montana, and North Carolina.

During 2004, the United States had only one operation in known diamond-bearing areas from which diamonds were produced. That diamond operation is in Crater of Diamonds State Park near Murfreesboro in Pike County, AR, where a dig-for-fee operation for tourists and rockhounds is maintained by the State of Arkansas. Crater of Diamonds is the only diamond mine in the world that is open to the public. The diamonds occur in a lamproite breccia tuff associated with a volcanic pipe and in the soil developed from the lamproite breccia tuff. In 2004, 383 diamond stones with an average weight of 0.2 carats were recovered at Crater of Diamonds State Park. Since the diamond-bearing pipe and the adjoining area became a State park in 1972, 22,833 diamond stones have been recovered (Rachel Engebrecht, park interpreter, Crater of Diamonds State Park, written commun., July 11, 2004). Exploration has demonstrated that there is about 78.5 million metric tons (Mt) of diamond-bearing rock in this diamond deposit (Howard, 1999, p. 62). An Arkansas law, enacted early in 1999, prohibits commercial diamond mining in the park (Diamond Registry Bulletin, 1999).

The Kelsey Lake diamond mine was a commercially operated diamond mine, located close to the Colorado-Wyoming State line near Fort Collins, CO. Diamond was produced at Kelsey Lake through April 2002, but the mine has been in care-and-maintenance mode since then with no additional production reported. The Kelsey Lake property includes nine known kimberlite pipes, of which three have been tested and have shown that diamonds are present. The remaining six pipes have yet to be fully explored and tested for their diamond potential. Of the diamonds recovered, 50% to 65% was clear gem quality, and almost one-third was one carat or larger in size. The identified resources are at least 17 Mt grading an average of 4 carats per 100 metric tons (Taylor Hard Money Advisers, 2000§[1]).

Studies by the Wyoming Geological Survey have shown that Wyoming has the potential for a $1 billion diamond mining business. Wyoming has many of the same geologic conditions as Canada, and there is evidence of hundreds of kimberlite pipes in the State. Twenty diamondiferous kimberlite pipes and one diamondiferous mafic breccia pipe have been identified in southern Wyoming. Two of the largest kimberlite fields, State Line and Iron Mountain, and the largest lamproite field in the United States, Leucite Hills, are in Wyoming. There has been slight interest in the southern Wyoming and northern Colorado area by several diamond mining firms, but the only diamond mine developed in the area thus far is the Kelsey Lake Mine. Individual diamond gems worth $89,000 and $300,000 have been found there (Associated Press, 2002§).

The success of Canadian diamond mines has made people focus on whether there are also commercially producible diamond deposits in the United States. Currently, there are no operating commercial diamond mines in the United States. Australian and Canadian companies are now conducting diamond exploration in Alaska and Minnesota. Alaska has similar geologic terrain to the Northwest Territories; and garnet and other diamond indicator minerals, as well as 17 microscopic diamonds have been found near Anchorage. Two Canadian companies have invested $1 million in an exploration drilling program. Geologists from the University of Minnesota teamed with an Australian mining company are conducting a soil sampling program in Minnesota for mineral exploration, including diamond. The samples are being analyzed by Australia's WMC Resources Ltd. The scientists believe that there is good chance of success owing to Minnesota's similar geology to Canada (Diamond Registry Bulletin, 2005a).

In another exploration venture during the second half of 2004, Delta Mining and Exploration Corp. found a diamond-bearing kimberlite in an 80-acre site known as the Homestead property near Lewistown, MT. Preliminary tests have shown the presence of microscopic diamonds. The firm is now planning a $700,000 soil sampling program, as further exploration. Diamonds have been found in the stream beds and glacial valleys of Montana for years. One notable find was the 14-carat Lewis and Clark diamond found near Craig in 1990 (Associated Press, 2004§).

In addition to natural gemstones, laboratory-created gemstones and gemstone simulants are produced in the United States. Laboratory-created or synthetic gemstones have the same chemical, optical, and physical properties as the natural materials. Simulants have an appearance similar to that of a natural gemstone material, but they have different chemical, optical, and physical properties. Laboratory-created gemstones produced in the United States include alexandrite, diamond, emerald, moissanite, ruby, sapphire, and turquoise. Simulants of coral, lapis lazuli, malachite, and turquoise also are manufactured in the United States. In addition, certain colors of laboratory-created sapphire and spinel, used to represent other gemstones, are classified as simulants.

Laboratory-created gemstone production in the United States was valued at more than $30.7 million during 2004; simulant gemstone output was even greater and was estimated to be valued at more than $100 million. Five firms in five States, representing virtually the entire U.S. laboratory-created gemstone industry, reported production to the USGS. The States with reported laboratory-created gemstone production, in descending production value order, were North Carolina, Florida, Massachusetts, Michigan, and Arizona.

Gemesis Corp., a company in Sarasota, FL, produced consistent quality laboratory-created gem diamond and reported a fifth year of production in 2004. The laboratory-created diamonds are produced using equipment, expertise, and technology developed by a team of scientists from Russia and the University of Florida. The weight of the laboratory-created diamond stones range from 1.5 to 2 carats, and most of the stones are yellow, brownish yellow, colorless, and green (Weldon, 1999§). Gemesis uses diamond-growing machines, each machine capable of growing 3-carat rough diamonds by generating high pressures and high temperatures (HPHT) that recreate the conditions in the Earth's mantle, where natural diamonds form. Gemesis eventually plans to have 250 diamond-growing machines installed at their facility near Sarasota, FL (Davis, 2003); at that point, Gemesis could be producing as much as 30,000 to 40,000 stones each year, and annual revenues may hit $70 million to $80 million (Diamond Registry Bulletin, 2001). Gemesis diamonds became available for retail purchase in jewelry stores and on the Internet in fall 2003. The prices of the Gemesis laboratory-created diamonds are below those of natural diamond but above the prices of simulated diamond (Weldon, 2003§).

Apollo Diamond, Inc., a company near Boston, MA, has developed a method for growing gem-quality diamond by chemical vapor deposition (CVD). Robert Linares of Apollo Diamond received a patent for the process in June 2003. The CVD technique transforms carbon into plasma, which then is precipitated onto a substrate as diamond. CVD has been used for more that a decade to cover large surfaces with microscopic diamond crystals, but until this process, no one had discovered the combination of temperature, gas composition, and pressure that resulted in the growth of a single diamond crystal. CVD diamond precipitates as nearly 100% pure, almost flawless diamond, and therefore may not be discernible from natural diamond by some tests (Davis, 2003). Apollo Diamond is producing 1-carat stones thus far, but hopes to be making 2-carat stones by 2006. The company is planning to start selling their

[1]References that include a section mark (§) are found in the Internet References Cited section.

diamonds in the jewelry market during the last half of 2005 at costs 10% to 30% below those of comparable natural diamonds (Hastings, 2005).

In early 2004, scientists at the Carnegie Institution's Geophysical Laboratory published a study that showed researchers grew diamond crystals by a special CVD process at very high growth rates. They were able to grow gem-sized crystals in a day; a growth rate 100 times faster than other methods used to date. The lead author of the study said that the diamonds were much harder to polish than conventional diamond crystals produced by HPHT methods. This is a new way of producing diamond crystals for such new applications as diamond-based electronic devices and next-generation cutting tools (Willis, 2004). By early 2005, the Carnegie Institution's Geophysical Laboratory and the University of Alabama had jointly developed and patented the CVD process and apparatus to produce 10-carat, ½-inch-thick single diamond crystals at very rapid growth rates (100 micrometers per hour). This faster CVD method uses microwave plasma technology, and it allows multiple crystals to be grown simultaneously. This size is about five times that of commercially available lab-created diamonds produced by HPHT and other CVD techniques. Dr. Russell Hemley of the Carnegie Institute stated, "High-quality crystals over 3 carats are very difficult to produce using the conventional approach. Several groups have begun to grow diamond single crystals by CVD, but large, colorless, and flawless ones remain a challenge. Our fabrication of 10-carat, half-inch, CVD diamonds is a major breakthrough" (Willis, 2004; Carnegie Institution of Washington, 2005; Science Blog, 2005§). Both Apollo Diamond and the Carnegie Institution have noted that their diamonds produced by the CVD method are harder than natural diamonds and diamonds produced by HPHT methods.

In 2004, the North Carolina company Charles & Colvard, Ltd. entered its seventh year of marketing moissanite, a gem-quality laboratory-created silicon carbide it produces. Moissanite is also an excellent diamond simulant, but it is being marketed for its own gem qualities. Moissanite exhibits a higher refractive index (brilliance) and higher luster than diamond. Its hardness is between corundum (ruby and sapphire) and diamond, which gives it durability (Charles & Colvard, Ltd., 2005§).

**Consumption**

Although the United States accounted for little of the total global gemstone production, it was the world's leading gemstone market. U.S. gemstone markets accounted for more than an estimated 35% of world gemstone demand in 2004. The U.S. market for unset gem-quality diamond during the year was estimated to have exceeded $14.6 billion. Domestic markets for natural, unset nondiamond gemstones totaled nearly $859 million.

In the United States, about two-thirds of domestic consumers designate diamond as their favorite gemstone when surveyed. In 2004, the top 10 selling colored gemstones, in descending order, were blue sapphire, fancy sapphire, ruby, tanzanite, emerald, pink tourmaline, amethyst, blue topaz, peridot, and pearl. Tsavorite garnet, aquamarine, opal, and green tourmaline dropped out of the top 10 from the previous year. Only 13% of the jewelry retailers said their sales were down in 2004 compared with 25% in 2003 (Wade, 2004; Prost, 2005). During 2004, U.S. retail jewelry store sales reached $28.3 billion, an increase of 5% compared with the previous year (by value). Jewelers' sales for the month of December 2004 were $6.7 billion, a 2% increase compared with that of December 2003 (Rapaport Diamond Report, 2005). Global retail sales of diamond jewelry increased by about 6.2% in 2004 compared with the previous year (Diamond Registry Bulletin, 2005d). The U.S. market accounted for more than 50% of the global diamond jewelry retail market in 2004.

**Prices**

Gemstone prices are governed by many factors and qualitative characteristics, including beauty, clarity, defects, demand, durability, and rarity. Diamond pricing, in particular, is complex; values can vary significantly depending on time, place, and the subjective evaluations of buyers and sellers. There are more than 14,000 categories used to assess rough diamond and more than 100,000 different combinations of carat, clarity, color, and cut values used to assess polished diamond (Pearson, 1998).

Colored gemstone prices are generally influenced by market supply and demand considerations, and diamond prices are supported by producer controls on the quantity and quality of supply. Values and prices of gemstones produced and/or sold in the United States are listed in tables 3 through 5. In addition, customs values for diamonds and other gemstones imported, exported, or reexported are listed in tables 6 through 10.

De Beers Group companies are a significant force affecting gem diamond prices worldwide because they mine more than 40% of the diamond produced each year (De Beers Group, 2004§). De Beers companies also sort and valuate about two-thirds (by value) of the world's annual supply of rough diamond through De Beers' subsidiary Diamond Trading Co. (DTC), which has marketing agreements with other producers (De Beers Group, 2003§).

**Foreign Trade**

During 2004, total U.S. gemstone trade with all countries and territories was valued at more than $22.1 billion, which was an increase of 18% from that of the previous year. Diamond accounted for about 96% of the 2004 gemstone trade total. In 2004, U.S. exports and reexports of diamond were shipped to 89 countries and territories, and imports of all gemstones were received from 169 countries and territories (tables 6-10). During 2004, U.S. trade in cut diamond increased by about 14% compared with the previous year, and the United States remained the world's leading diamond importer. The United States is a significant international diamond transit center as well as the world's leading gem diamond market. The large volume of reexports shipped to other centers reveals the significance that the United States has in the world's diamond supply network (table 6).

In 2004, trade in laboratory-created gemstone increased by almost 13% for the United States compared with the previous year. Laboratory-created gemstone imports from Austria, China, Germany, Hong Kong, Sri Lanka, Switzerland, and Thailand made up almost 92% (by value) of the total domestic imports of laboratory-created gemstones during the year. Prices of certain laboratory-created gemstone imports, such as amethyst, were very competitive. The marketing of imported laboratory-created gemstones and enhanced gemstones as natural gemstones and the mixing of laboratory-created materials with natural stones in imported parcels continued to be problems for some domestic producers in 2004. There also were problems with some simulants being marketed as laboratory-created gemstones during the year.

**World Industry Structure**

The gemstone industry worldwide has two distinct sectors—diamond mining and marketing and the production and sale of colored gemstones. Most diamond supplies are controlled by a few major mining companies; prices are supported by managing the quality and quantity of the gemstones relative to demand, a function performed by De Beers through DTC. Unlike diamond, colored gemstones are primarily produced at relatively small, low-cost operations with few dominant producers; prices are influenced by consumer demand and supply availability.

In 2004, world diamond production totaled about 156 million carats—89.4 million carats gem quality and 66.6 million carats industrial grade (table 11). Most production was concentrated in a few regions—Africa [Angola, Botswana, Congo (Kinshasa), Namibia, and South Africa], Asia (northeastern Siberia and Yakutia in Russia), Australia, North America (Northwest Territories in Canada), and South America (Brazil and Venezuela). In 2004, Russia led the world in total diamond output quantity (combined gemstone and industrial). Botswana was the world's leading gemstone diamond producer, followed by Russia, Canada, and Australia, in descending quantity order.

Russian diamond production figures were released for the first time in December 2004. Production information had been kept as a state secret since the first diamond discovery in Siberia in 1955 (Diamond Registry Bulletin, 2005e).

De Beers reported that its sales of rough diamond for 2004 were $5.6 billion, which was up by 3% from $5.5 billion in 2003 (Diamond Registry Bulletin, 2004b; Diamond Registry Bulletin, 2005b).

Israel's polished diamond net exports increased by 14.4% to $6.33 billion during 2004, and its exports of rough diamond increased by 31% to $2.92 billion. The United States remained the leading diamond trading partner for Israel. Israel's rough diamond imports from the DTC were $932 million in 2004, which was 18% of their total rough imports. This was a drop from 22% in 2003 (Diamond Registry Bulletin, 2005c).

Additional events in 2004 significant to diamond mining, production, and marketing worldwide include the following:

- The Ekati Diamond Mine, Canada's first operating commercial diamond mine, completed its sixth full year of production. In 2004, Ekati produced 4.08 million carats of diamond from 4.54 Mt of ore (BHP Billiton Ltd., 2005). BHP Billiton Ltd. has an 80% controlling ownership of the Ekati, which is located in Northwest Territories in Canada. Ekati has estimated reserves of 60.3 Mt of ore in kimberlite pipes that contain 54.3 million carats of diamond, and Ekati projected the mine life to be 25 years. Ekati diamonds are sold by BHP's Antwerp sales office. The Ekati Mine is now producing from the Koala, Panda, and Misery kimberlite pipes. In November 2002, BHP began using underground mining techniques to recover diamonds from deeper portions of the Koala kimberlite pipe, which was first open-pit mined (Diamond Registry Bulletin, 2002). Plans were approved for underground mining of deeper portions of the adjacent Panda kimberlite pipe, and initial production was expected in early 2005 (BHP Billiton Ltd., 2004).
- The Diavik Diamond Mine, also in the Northwest Territories, completed its second full year of production. In 2004, Diavik produced 7.57 million carats of diamond from its A154 North ore body and the adjacent A154 South pipe. Both pipes are located within the same pit (Diavik Diamond Mines Inc., 2005). The Diavik Diamond Mine has estimated its reserves to be 25.6 Mt of ore in kimberlite pipes, containing 107 million carats of diamond, and Diavik projected the mine life to be 16 to 22 years. Diavik is an unincorporated joint venture between Diavik Diamond Mines Inc. (60%) and Aber Diamond Mines Ltd. (40%). The mine is expected to produce about 107 million carats of diamond at a rate of 8 million carats per year worth about $63 per carat (Diavik Diamond Mines Inc., 2000, p. 10-12).

In 2002, an international rough diamond certification system called the Kimberley Process Certification Scheme (KPCS) was implemented to solve the problem of conflict diamonds—rough diamonds used by rebel forces and their allies to help finance warfare aimed at subverting governments recognized as legitimate by the United Nations (UN). The KPCS was agreed upon by UN member nations, the diamond industry, and involved nongovernmental organizations. The KPCS includes the following key elements: the use of forgery-resistant certificates and tamper-proof containers for shipments of rough diamonds; internal controls and procedures that provide credible assurance that conflict diamonds do not enter the legitimate diamond market; a certification process for all exports of rough diamonds; the gathering, organizing, and sharing of import and export data on rough diamonds with other participants of relevant production; credible monitoring and oversight of the international certification scheme for rough diamonds; effective enforcement of the provisions of the certification scheme through dissuasive and proportional penalties for violations; self regulation by the diamond industry that fulfills minimum requirements; and the sharing of information with all other participants on relevant rules, procedures, and legislation as well as examples of national certificates used to accompany shipments of rough diamonds (Weldon, 2001§). Canada acted as the chair and secretariat of the KPCS for the first 2 years, and in October, Russia assumed these duties. The KPCS will not be fully implemented until all participating countries have passed the necessary laws to carry it out. The Kimberley Process presently comprises 43 participants, and these participants account for approximately 99.8% of the global production of rough diamonds (Kimberley Process, 2005§). Discussions about the possible participation of several other countries are ongoing.

In the United States, the Clean Diamond Trade Act, which will implement effective measures to stop trade in conflict diamonds, was passed by the U.S. House of Representatives on April 8, 2003, and by the U.S. Senate on April 10, 2003. The President signed the Act into law on April 25, 2003. Enactment of the Clean Diamond Trade Act made the United States a full participant in the KPCS (U.S. House of Representatives, 2003§). U.S. participation is critical to the success of the KPCS in excluding conflict diamonds from the legitimate supply chain because the United States is the world's leading gem diamond market. The industry and trade associations have played an active role in achieving this progress in ending the problem of conflict diamonds (Professional Jeweler, 2003§).

At the end of 2003, De Beers and the U.S. Department of Justice began work toward settlement of its long-running dispute over alleged illegal price fixing. On July 13, De Beers Centenary AG pled guilty in Federal court in Ohio to conspiring to fix the price of industrial diamond in the United States and elsewhere, resolving a 1994 case. De Beers was sentenced to pay a $10 million fine. With this settlement, De Beers is now free to enter the U.S. market (Diamond Registry Bulletin, 2004c, d).

Worldwide, the value of production of natural gemstones other than diamond was estimated to have exceeded $2 billion in 2004. Most nondiamond gemstone mines are small, low-cost, and widely dispersed operations in remote regions of developing nations. Foreign countries with major gemstone deposits other than diamond are Afghanistan (aquamarine, beryl, emerald, kunzite, lapis lazuli, ruby, and tourmaline), Australia (beryl, opal, and sapphire), Brazil (agate, amethyst, beryl, ruby, sapphire, topaz, and tourmaline), Burma (beryl, jade, ruby, sapphire, and topaz), Colombia (beryl, emerald, and sapphire), Kenya (beryl, garnet, and sapphire), Madagascar (beryl, rose quartz, sapphire, and tourmaline), Mexico (agate, opal, and topaz), Sri Lanka (beryl, ruby, sapphire, and topaz), Tanzania (garnet, ruby, sapphire, tanzanite, and tourmaline), and Zambia (amethyst and beryl). In addition, pearls are cultured throughout the South Pacific and in other equatorial waters; Australia, China, French Polynesia, and Japan are key producers.

The U.S. colored gemstone market posted an overall increase in sales during 2004 compared with the previous years sales. The popularity of colored gemstones, colored laboratory-created gemstones, and "fancy" colored diamonds continued to increase in 2004. This was indicated by the increased U.S. imports for consumption values in most colored stone categories (emerald, coral, rubies, sapphires, other precious and semiprecious stones, and laboratory-created) in 2004 compared with the values from the previous year (table 10). Colored stone popularity also was evidenced by their general slight sales increase in 2004 (Prost, 2005).

Tanzanite continued its popularity, moving back to fourth best selling stone in 2004 after moving up to third best selling stone in 2003. This popularity is in part owing to the American Gem Trade Association (a United States and Canadian trade association) adding tanzanite to the traditional list of birthstones for December in 2002. It is by far the most popular of blue and violet-blue gemstones after sapphire. Tanzanite is characterized by combinations of royal blue and burgundy hues, which have an almost universal appeal. While some tanzanite displays a trace of blue when it is originally mined, most crystals emerge from the Earth with a muted gray-green color. All tanzanite has been subjected to a heat process to produce the violet-blue hues. The only known source of tanzanite is a 5-square-mile area in the hills of Merelani, 10 miles south of the Kilimanjaro International Airport, between Moshi and Arusha in Tanzania. Its rarity appears to also add to tanzanite's growing popularity among consumers.

Though U.S. shell production increased by 61% in 2004 compared with 2003, shell is not expected to ever be the large segment of U.S. gemstone production it was for several years in the past. The U.S. shell material from mussels is used as seed material for culturing pearls. The lower shell production is owing to overharvesting in past years, the killing off of U.S. native mussel species by invasive exotic species, and a decline in market demand. During the past 10 years, the United States has lost about three-quarters of the native mussel population, and one-half of the approximately 300 total U.S. native mussel species are now listed as endangered species. The zebra mussel is the invasive exotic species that has done most of the damage, and it has been introduced into U.S. rivers and waterways in discharged ballast water from transoceanic ships (Iowa Department of Natural Resources, 2001§; Scott Gritterf, fisheries biologist, Iowa Department of Natural Resources, oral commun., November 14, 2002). The market still has not completely recovered from the die-off of Japanese oysters. Seed material had been stockpiled in Japan, and now producers in Japan are using manmade seed materials or seed materials from China and other sources in addition to the stockpiled material. There also has been an increase in the popularity of darker and colored pearls that do not use U.S. seed material (Ted Kroll, assistant director of fisheries, Kentucky Department of Fish and Wildlife, oral commun., November 15, 2002). In some regions of the United States, shell from mussels is beginning to be used as a gemstone based on its own merit, rather than as seed material for pearls. This shell material is being used in beads, jewelry, and watch faces.

## Outlook

There are indications that there may be continued growth in U.S. diamond and jewelry markets in 2005. Historically, diamonds have proven to hold their value despite wars or economic depressions (Schumann, 1998, p. 8).

Diamond exploration is continuing in Canada, and many new deposits have been found. There are several other commercial diamond projects and additional discoveries located in Alberta, British Columbia, Northwest Territories, Nunavut, Ontario, and Quebec. Canada produced about 14% of the world's diamond in 2004, and in price per carat of diamond produced, Canada outranked many of the world's traditionally major diamond-mining countries (Diamond Registry Bulletin, 2004a). Canadian production continues to increase, and Canada is now third in production of gemstone diamond, after Botswana and Russia.

Independent producers, such as Argyle Diamond Mines in Australia and Ekati and Diavik in Canada, will continue to bring a greater measure of competition to global markets. More competition presumably will bring more supplies and lower prices. Further consolidation of diamond producers and larger amounts of rough diamond being sold outside DTC will continue as the diamond industry adjusts to De Beers' reduced influence on the industry.

More laboratory-created gemstones, simulants, and treated gemstones will enter the marketplace and necessitate more transparent trade industry standards to maintain customer confidence.

Internet sales of diamonds, gemstones, and jewelry has grown tremendously during 2004, and they will continue to grow and increase in popularity, as will other forms of e-commerce that emerge to serve the diamond and gemstone industry. This will take place as the gemstone industry and its customers become more comfortable with and learn the applications of new e-commerce tools (Diamond Registry Bulletin, 2004e, f).

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TABLE 1

GUIDE TO SELECTED GEMSTONES AND GEM MATERIALS USED IN JEWELRY

| Name | Composition | Color | Practical size[1] | Cost[2] | Mohs | Specific gravity | Refraction | Refractive index | May be confused with | Recognition characteristics |
|---|---|---|---|---|---|---|---|---|---|---|
| Amber | Hydrocarbon | Yellow, red, green, blue | Any | Low to medium | 2.0-2.5 | 1.0-1.1 | Single | 1.54 | Synthetic or pressed plastics, kaurigum | Fossil resin, color, low density, soft and trapped insects. |
| Apatite | Chlorocalcium phosphate | Colorless, pink, yellow, green, blue, violet | Small | Low | 5.0 | 3.16-3.23 | Double | 1.63-1.65 | Amblygonite, andalusite, brazilianite, precious beryl, titanite, topaz, tourmaline | Crystal habit, color, hardness, appearance. |
| Azurite | Copper carbonate hydroxide | Azure, dark blue, pale blue | Small to medium | do. | 3.5-4.0 | 3.7-3.9 | do. | 1.72-1.85 | Dumortierite, hauynite, lapis lazuli, lazulite, sodalite | Color, softness, crystal habits and associated minerals. |
| Benitoite | Barium titanium silicate | Blue, purple, pink, colorless | do. | High | 6.0-6.5 | 3.64-3.68 | do. | 1.76-1.80 | Sapphire, tanzanite, blue diamond, blue tourmaline, cordierite | Strong blue in ultraviolet light. |
| Beryl: | | | | | | | | | | |
| Aquamarine | Beryllium aluminum silicate | Blue-green to light blue | Any | Medium to high | 7.5-8.0 | 2.63-2.80 | do. | 1.58 | Synthetic spinel, blue topaz | Double refraction, refractive index. |
| Bixbite | do. | Red | Small | Very high | 7.5-8.0 | 2.63-2.80 | do. | 1.58 | Pressed plastics, tourmaline | Refractive index. |
| Emerald | do. | Green | Medium | do. | 7.5 | 2.63-2.80 | do. | 1.58 | Fused emerald, glass, tourmaline, peridot, green garnet doublets | Emerald filter, dichroism, refractive index. |
| Emerald, synthetic | do. | do. | Small | High | 7.5-8.0 | 2.63-2.80 | do. | 1.58 | Genuine emerald | Lack of flaws, brilliant fluorescence in ultraviolet light. |
| Golden (heliodor) | do. | Yellow to golden | Any | Low to medium | 7.5-8.0 | 2.63-2.80 | do. | 1.58 | Citrine, topaz, glass, doublets | Weak-colored. |
| Goshenite | do. | Colorless | do. | Low | 7.5-8.0 | 2.63-2.80 | do. | 1.58 | Quartz, glass, white sapphire, white topaz | Refractive index. |
| Morganite | do. | Pink to rose | do. | do. | 7.5-8.0 | 2.63-2.80 | do. | 1.58 | Kunzite, tourmaline, pink sapphire | Do. |
| Calcite: | | | | | | | | | | |
| Marble | Calcium carbonate | White, pink, red, blue, green, or brown | do. | do. | 3.0 | 2.72 | Double (strong) | 1.49-1.66 | Silicates, banded agate, alabaster gypsum | Translucent. |
| Mexican onyx | do. | do. | do. | do. | 3.0 | 2.72 | do. | 1.60 | do. | Banded, translucent. |
| Charoite | Hydrated sodium calcium hydroxi-fluoro-silicate | Lilac, violet, or white | Small to medium | do. | 5.0-6.0 | 2.54-2.78 | XX | 1.55-1.56 | Purple marble | Color, locality. |
| Chrysoberyl: | | | | | | | | | | |
| Alexandrite | Beryllium aluminate | Green by day light, red by artificial light | Small (CIS[3]); medium (Sri Lanka) | High | 8.5 | 3.50-3.84 | Double | 1.75 | Synthetic | Strong dichroism, color varies from red to green, hardness. |

See footnotes at end of table.

TABLE 1—Continued

GUIDE TO SELECTED GEMSTONES AND GEM MATERIALS USED IN JEWELRY

| Name | Composition | Color | Practical size[1] | Cost[2] | Mohs | Specific gravity | Refraction | Refractive index | May be confused with | Recognition characteristics |
|---|---|---|---|---|---|---|---|---|---|---|
| Chrysoberyl—Continued: | | | | | | | | | | |
| Cats-eye | Beryllium aluminate | Greenish to brownish | Small to large | High | 8.5 | 3.50-3.84 | Double | 1.75 | Synthetic, shell | Density, translucence, chatoyance. |
| Chrysolite | do. | Yellow, green, and/or brown | Medium | Medium | 8.5 | 3.50-3.84 | do. | 1.75 | Tourmaline, peridot | Refractive index, silky. |
| Chrysocolla | Hydrated copper silicate | Green, blue | Any | Low | 2.0-4.0 | 2.0-2.4 | XX | 1.46-1.57 | Azurite, dyed chalcedony, malachite, turquoise, variscite | Lack of crystals, color, fracture, low density and softness. |
| Coral | Calcium carbonate | Orange, red, white, black, purple, or green | Branching, medium | do. | 3.5-4.0 | 2.6-2.7 | Double | 1.49-1.66 | False coral | Dull translucent. |
| Corundum: | | | | | | | | | | |
| Ruby | Aluminum oxide | Rose to deep purplish red | Small | Very high | 9.0 | 3.95-4.10 | do. | 1.78 | Synthetics, including spinel, garnet | Inclusions, fluorescence. |
| Sapphire, blue | do. | Blue | Medium | High | 9.0 | 3.95-4.10 | do. | 1.78 | do. | Inclusions, double refraction, dichroism. |
| Sapphire, fancy | do. | Yellow, pink, colorless, orange, green, or violet | Medium to large | Medium | 9.0 | 3.95-4.10 | do. | 1.78 | Synthetics, glass and doublets, morganite | Inclusions, double refreaction, refractive index. |
| Sapphire and ruby, stars | do. | Red, pink, violet, blue, or gray | do. | High to low | 9.0 | 3.95-4.10 | do. | 1.78 | Star quartz, synthetic stars | Shows asterism, color side view. |
| Sapphire or ruby, synthetic | do. | Yellow, pink, or blue | Up to 20 carats | Low | 9.0 | 3.95-4.10 | do. | 1.78 | Synthetic spinel, glass | Curved striae, bubble inclusions. |
| Cubic zirconia | Zirconium and yttrium oxides | Colorless, pink, blue, lavender, yellow | Small | do. | 8.25-8.5 | 5.8 | Single | 2.17 | Diamond, zircon, titania, moissanite | Hardness, density, lack of flaws and inclusions, refractive index. |
| Diamond | Carbon | White, blue-white, yellow, brown, green, red, pink, blue | Any | Very high | 10.0 | 3.516-3.525 | do. | 2.42 | Zircon, titania, cubic zirconia, moissanite | High index, dispersion, hardness, luster. |
| Feldspar: | | | | | | | | | | |
| Amazonite | Alkali aluminum silicate | Green-blue | Large | Low | 6.0-6.5 | 2.56 | XX | 1.52 | Jade, turquoise | Cleavage, sheen, vitreous to pearly, opaque, grid. |
| Labradorite | do. | Gray with blue and bronze sheen color play (schiller) | do. | do. | 6.0-6.5 | 2.56 | XX | 1.56 | do. | Do. |
| Moonstone | do. | Colorless, white, gray, or yellow with white, blue, or bronze schiller | do. | do. | 6.0-6.5 | 2.77 | XX | 1.52-1.54 | Glass, chalcedony, opal | Pale sheen, opalescent. |
| Sunstone | do. | Orange, red brown, colorless with gold or red glittery schiller | Small to medium | do. | 6.0-6.5 | 2.77 | XX | 1.53-1.55 | Aventurine, glass | Red glittery schiller. |

See footnotes at end of table.

TABLE 1—Continued

GUIDE TO SELECTED GEMSTONES AND GEM MATERIALS USED IN JEWELRY

| Name | Composition | Color | Practical size[1] | Cost[2] | Mohs | Specific gravity | Refraction | Refractive index | May be confused with | Recognition characteristics |
|---|---|---|---|---|---|---|---|---|---|---|
| Garnet | Complex silicate | Brown, black, yellow, green, red, or orange | Small to medium | Low to high | 6.5-7.5 | 3.15-4.30 | Single strained | 1.79-1.98 | Synthetics, spinel, glass | Single refraction, anomalous strain. |
| Hematite | Iron oxide | Black, black-gray, brown-red | Medium to large | Low | 5.5-6.5 | 5.12-5.28 | XX | 2.94-3.22 | Davidite, cassiterite, magnetite, neptunite, pyrolusite, wolframite | Crystal habit, streak, hardness. |
| Jade: | | | | | | | | | | |
| Jadeite | Complex silicate | Green, yellow, black, white, or mauve | Large | Low to very high | 6.5-7.0 | 3.3-3.5 | Crypto-crystalline | 1.65-1.68 | Nephrite, chalcedony, onyx, bowenite, vesuvianite, grossularite | Luster, spectrum, translucent to opaque. |
| Nephrite | Complex hydrous silicate | do. | do. | do. | 6.0-6.5 | 2.96-3.10 | do. | 1.61-1.63 | Jadeite, chalcedony, onyx, bowenite, vesuvianite, grossularite | Do. |
| Jet (gagate) | Lignite | Deep black, dark brown | do. | Low | 2.5-4.0 | 1.19-1.35 | XX | 1.64-1.68 | Anthracite, asphalt, cannel coal, onyx, schorl, glass, rubber | Luster, color. |
| Lapis lazuli | Sodium calcium aluminum silicate | Dark azure-blue to bright indigo blue or even a pale sky blue. | do. | do. | 5.0-6.0 | 2.50-3.0 | XX | 1.50 | Azurite, dumortierite, dyed howlite, lazulite, sodalite, glass | Color, crystal habit, associated minerals, luster, and localities. |
| Malachite | Hydrated copper carbonate | Light to black-green banded | do. | do. | 3.5-4.0 | 3.25-4.10 | XX | 1.66-1.91 | Brochantite, chrysoprase, opaque green gemstones | Color banding, softness, associated minerals. |
| Moissanite | Silicon carbide | Colorless and pale shades of green, blue, yellow | Small | Low to medium | 9.25 | 3.21 | Double | 2.65-2.69 | Diamond, zircon, titania, cubic zirconia | Hardness, dispersion, lack of flaws and inclusions, refractive index. |
| Obsidian | Amorphous, variable (usually felsic) | Black, gray, brown, dark green, white, transparent | Large | Low | 5.0-5.5 | 2.35-2.60 | XX | 1.45-1.55 | Aegirine-augite, gadolinite, gagate, hematite, pyrolusite, wolframite | Color, conchoidal fracture, flow bubbles, softness, and lack of crystal faces. |
| Opal | Hydrated silica | Reddish orange, colors flash in white gray, black, red, or yellow | do. | Low to high | 5.5-6.5 | 1.9-2.3 | Single | 1.45 | Glass, synthetics, triplets, chalcedony | Color play (opalescence). |
| Peridot | Iron magnesium silicate | Yellow and/or green | Any | Medium | 6.5-7.0 | 3.27-3.37 | Double (strong) | 1.65-1.69 | Tourmaline, chrysoberyl | Strong double refraction, low dichroism. |
| Quartz: | | | | | | | | | | |
| Agate | Silicon dioxide | Any | Large | Low | 7.0 | 2.58-2.64 | XX | XX | Glass, plastic, Mexican onyx | Cryptocrystalline, irregularly banded, dendritic inclusions. |

See footnotes at end of table.

TABLE 1—Continued

GUIDE TO SELECTED GEMSTONES AND GEM MATERIALS USED IN JEWELRY

| Name | Composition | Color | Practical size[1] | Cost[2] | Mohs | Specific gravity | Refraction | Refractive index | May be confused with | Recognition characteristics |
|---|---|---|---|---|---|---|---|---|---|---|
| Quartz—Continued: | | | | | | | | | | |
| Amethyst | Silicon dioxide | Purple | Large | Medium | 7.0 | 2.65-2.66 | Double | 1.55 | Glass, plastic, fluorite | Macrocrystalline, color, refractive index, transparent, hardness. |
| Aventurine | do. | Green, red-brown, gold-brown, with metallic iridescent reflection | do. | Low | 7.0 | 2.64-2.69 | do. | 1.54-1.55 | Iridescent analcime, aventurine feldspar, emerald, aventurine glass | Macrocrystalline, color, metallic iridescent flake reflections, hardness. |
| Cairngorm | do. | Smoky orange or yellow | do. | do. | 7.0 | 2.65-2.66 | do. | 1.55 | do. | Macrocrystalline, color, refractive index, transparent, hardness. |
| Carnelian | do. | Flesh red to brown red | do. | do. | 6.5-7.0 | 2.58-2.64 | do. | 1.53-1.54 | Jasper | Cryptocrystalline, color, hardness. |
| Chalcedony | do. | Bluish, white, gray | do. | do. | 6.5-7.0 | 2.58-2.64 | do. | 1.53-1.54 | Tanzanite | Do. |
| Chrysoprase | do. | Green, apple-green | do. | do. | 6.5-7.0 | 2.58-2.64 | do. | 1.53-1.54 | Chrome chalcedony, jade, prase opal, prehnite, smithsonite, variscite, artifically colored green chalcedony | Do. |
| Citrine | Silica | Yellow | do. | do. | 7.0 | 2.65-2.66 | do. | 1.55 | do. | Macrocrystalline, color, refractive index, transparent, hardness. |
| Crystal: | | | | | | | | | | |
| Rock | do. | Colorless | do. | do. | 7.0 | 2.65-2.66 | do. | 1.55 | Topaz, colorless sapphire | Do. |
| Jasper | do. | Any, striped, spotted, or sometimes uniform | do. | do. | 7.0 | 2.58-2.66 | XX | XX | do. | Cryptocrystalline, opaque, vitreous luster, hardness. |
| Onyx | do. | Many colors | do. | do. | 7.0 | 2.58-2.64 | XX | XX | do. | Cryptocrystalline, uniformly banded, hardness. |
| Petrified wood | do. | Brown, gray, red, yellow | do. | do. | 6.5-7.0 | 2.58-2.91 | Double | 1.54 | Agate, jasper | Color, hardness, wood grain. |
| Rose | do. | Pink, rose red | do. | do. | 7.0 | 2.65-2.66 | do. | 1.55 | do. | Macrocrystalline, color, refractive index, transparent, hardness. |
| Tiger's eye | do. | Golden yellow, brown, red, blue-black | do. | do. | 6.5-7.0 | 2.58-2.64 | XX | 1.53-1.54 | XX | Macrocrystalline, color, hardness, hatoyancy. |

See footnotes at end of table.

TABLE 1—Continued

GUIDE TO SELECTED GEMSTONES AND GEM MATERIALS USED IN JEWELRY

| Name | Composition | Color | Practical size[1] | Cost[2] | Mohs | Specific gravity | Refraction | Refractive index | May be confused with | Recognition characteristics |
|---|---|---|---|---|---|---|---|---|---|---|
| Rhodochrosite | Manganese carbonate | Rose-red to yellowish, stripped | Large | Low | 4.0 | 3.45-3.7 | Double | 1.6-1.82 | Fire opal, rhodonite, tugtupite, tourmaline | Color, crystal habit, reaction to acid, perfect rhombohedral cleavage. |
| Rhodonite | Manganese iron calcium silicate | Dark red, flesh red, with dendritic inclusions of black manganese oxide | do. | do. | 5.5-6.5 | 3.40-3.74 | do. | 1.72-1.75 | Rhodochrosite, thulite, hessonite, spinel, pyroxmangite, spessartine, tourmaline | Color, black inclusions, lack of reaction to acid, hardness. |
| Shell: | | | | | | | | | | |
| Mother-of-pearl | Calcium carbonate | White, cream, green, blue-green, with iridescent play of color | Small | do. | 3.5 | 2.6-2.85 | XX | XX | Glass and plastic imitation | Luster, iridescent play of color. |
| Pearl | do. | White, cream to black, sometimes with hint of pink, green, purple | do. | Low to high | 2.5-4.5 | 2.6-2.85 | XX | XX | Cultured and glass or plastic imitation | Luster, iridescence, x-structure, ray. |
| Spinel | Magnesium aluminum oxide | Any | Small to medium | Medium | 8.0 | 3.5-3.7 | Single | 1.72 | Synthetic, garnet | Refractive index, single refraction, inclusions. |
| Spinel, synthetic | do. | do. | Up to 40 carats | Low | 8.0 | 3.5-3.7 | Double | 1.73 | Spinel, corundum, beryl, topaz, alexandrite | Weak double refraction, curved striae, bubbles. |
| Spodumene: | | | | | | | | | | |
| Hiddenite | Lithium aluminum silicate | Yellow to green | Medium | Medium | 6.5-7.0 | 3.13-3.20 | do. | 1.66 | Synthetic spinel | Refractive index, color, pleochroism. |
| Kunzite | do. | Pink to lilac | do. | do. | 6.5-7.0 | 3.13-3.20 | do. | 1.66 | Amethyst, morganite | Do. |
| Tanzanite | Complex silicate | Blue to lavender | Small | High | 6.0-7.0 | 3.30 | do. | 1.69 | Sapphire, synthetics | Strong trichroism, color. |
| Topaz | do. | White, blue, green, pink, yellow, gold | Medium | Low to medium | 8.0 | 3.4-3.6 | do. | 1.62 | Beryl, quartz | Color, density, hardness, refractive index, perfect in basal cleavage. |
| Tourmaline | do. | Any, including mixed | do. | do. | 7.0-7.5 | 2.98-3.20 | do. | 1.63 | Peridot, beryl, garnet corundum, glass | Double refraction, color, refractive index. |
| Turquoise | Copper aluminum phosphate | Blue to green with black, brown-red inclusions | Large | Low | 6.0 | 2.60-2.83 | do. | 1.63 | Chrysocolla, dyed howlite, dumortierite, glass, plastics, variscite | Difficult if matrix not present, matrix usually limonitic. |
| Unakite | Granitic rock, feldspar, epidote, quartz | Olive green, pink, and blue-gray | do. | do. | 6.0-7.0 | 2.60-3.20 | XX | XX | XX | Olive green, pink, gray-blue colors. |
| Zircon | Zirconium silicate | White, blue, brown, yellow, or green | Small to medium | Low to medium | 6.0-7.5 | 4.0-4.8 | Double (strong) | 1.79-1.98 | Diamond, synthetics, topaz, aquamarine | Double refraction, strongly dichroic, wear on facet edges. |

XX Not applicable.

[1]Small: up to 5 carats; medium: 5 to 50 carats; large: more than 50 carats.

[2]Low: up to $25 per carat; medium: up to $200 per carat; high: more than $200 per carat.

[3]Commonwealth of Independent States.

TABLE 2

LABORATORY-CREATED GEMSTONE PRODUCTION METHODS

| Gemstone | Production method | Company/producer | Date of first production |
|---|---|---|---|
| Alexandrite | Flux | Creative Crystals | 1970s. |
| Do. | Melt pulling | J.O. Crystal | 1990s. |
| Do. | do. | Kyocera | 1980s. |
| Do. | Zone melt | Seiko | 1980s. |
| Cubic zirconia | Skull melt | Various producers | 1970s. |
| Emerald | Flux | Chatham | 1930s. |
| Do. | do. | Gilson | 1960s. |
| Do. | do. | Kyocera | 1970s. |
| Do. | do. | Seiko | 1980s. |
| Do. | do. | Lennix | 1980s. |
| Do. | do. | Russia | 1980s. |
| Do. | Hydrothermal | Lechleitner | 1960s. |
| Do. | do. | Regency | 1980s. |
| Do. | do. | Biron | 1980s. |
| Do. | do. | Russia | 1980s. |
| Ruby | Flux | Chatham | 1950s. |
| Do. | do. | Kashan | 1960s. |
| Do. | do. | J.O. Crystal | 1980s. |
| Do. | do. | Douras | 1990s. |
| Do. | Zone melt | Seiko | 1980s. |
| Do. | Melt pulling | Kyocera | 1970s. |
| Do. | Verneuil | Various producers | 1900s. |
| Sapphire | Flux | Chatham | 1970s. |
| Do. | Zone melt | Seiko | 1980s. |
| Do. | Melt pulling | Kyocera | 1980s. |
| Do. | Verneuil | Various producers | 1900s. |
| Star ruby | do. | Linde | 1940s. |
| Do. | Melt pulling | Kyocera | 1980s. |
| Do. | do. | Nakazumi | 1980s. |
| Star sapphire | Verneuil | Linde | 1940s. |

TABLE 3
VALUE OF U.S. GEMSTONE PRODUCTION, BY TYPE[1]

(Thousand dollars)

| Gem materials | 2003 | 2004 |
|---|---|---|
| Beryl | 18 | 18 |
| Coral, all types | 118 | 261 |
| Diamond | (2) | (2) |
| Garnet | 56 | 207 |
| Gem feldspar | 659 | 659 |
| Geode/nodules | (3) | (3) |
| Opal | (3) | (3) |
| Quartz: | | |
| Macrocrystalline[4] | 228 | 206 |
| Cryptocrystalline[5] | 391 | 383 |
| Sapphire/ruby | 474 | 473 |
| Shell | 2,490 | 4,000 |
| Topaz | (3) | (3) |
| Tourmaline | 48 | 45 |
| Turquoise | 827 | 699 |
| Other | 6,870 r | 7,160 |
| Total | 12,500 | 14,500 |

[r]Revised.

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

[2]Included with "Other."

[3]Included in "Total."

[4]Macrocrystalline quartz (crystals recognizable with the naked eye) includes amethyst, amethyst quartz, aventurine, blue quartz, citrine, hawk's eye, pasiolite, prase, quartz cat's eye, rock crystal, rose quartz, smoky quartz, and tiger's eye.

[5]Cryptocrystalline (microscopically small crystals) includes agate carnelian, chalcedony, chrysoprase, fossilized wood, heliotrope, jasper, moss agate, onyx, and sard.

TABLE 4

PRICES OF U.S. CUT DIAMONDS, BY SIZE AND QUALITY IN 2004[1]

| Carat weight | Description, color[2] | Clarity[3] (GIA terms) | Representative prices | | |
|---|---|---|---|---|---|
| | | | January[4] | June[5] | December[6] |
| 0.25 | G | VS1 | $1,200 | $1,200 | $1,200 |
| do. | G | VS2 | 1,150 | 1,150 | 1,150 |
| do. | G | SI1 | 975 | 975 | 975 |
| do. | H | VS1 | 1,100 | 1,100 | 1,100 |
| do. | H | VS2 | 1,000 | 1,000 | 1,000 |
| do. | H | SI1 | 925 | 925 | 925 |
| 0.50 | G | VS1 | 3,200 | 3,200 | 3,200 |
| do. | G | VS2 | 2,800 | 2,800 | 2,800 |
| do. | G | SI1 | 2,400 | 2,400 | 2,400 |
| do. | H | VS1 | 2,800 | 2,800 | 2,800 |
| do. | H | VS2 | 2,400 | 2,400 | 2,400 |
| do. | H | SI1 | 2,200 | 2,200 | 2,200 |
| 0.75 | G | VS1 | 3,600 | 3,600 | 3,600 |
| do. | G | VS2 | 3,500 | 3,500 | 3,500 |
| do. | G | SI1 | 3,200 | 3,200 | 3,200 |
| do. | H | VS1 | 3,300 | 3,300 | 3,300 |
| do. | H | VS2 | 3,200 | 3,200 | 3,200 |
| do. | H | SI1 | 2,900 | 2,900 | 2,900 |
| 1.00 | G | VS1 | 5,800 | 5,800 | 5,800 |
| do. | G | VS2 | 5,500 | 5,500 | 5,500 |
| do. | G | SI1 | 4,800 | 4,800 | 4,800 |
| do. | H | VS1 | 5,200 | 5,200 | 5,200 |
| do. | H | VS2 | 4,900 | 4,900 | 4,900 |
| do. | H | SI1 | 4,700 | 4,700 | 4,700 |

[1]Data are rounded to no more than three significant digits.

[2]Gemological Institute of America (GIA) color grades:  D—colorless; E—rare white; G, H, I—traces of color.

[3]Clarity:  IF—no blemishes; VVS1—very, very slightly included; VS1—very slightly included; VS2—very slightly included, but not visible; SI1—slightly included.

[4]Source:  Jewelers' Circular Keystone, v. 174, no. 2, February 2003, p. 44.

[5]Source:  Jewelers' Circular Keystone, v. 174, no. 7, July 2003, p. 52.

[6]Source:  Jewelers' Circular Keystone, v. 175, no. 1, January 2004, p. 28.

TABLE 5
PRICES PER CARAT OF U.S. CUT COLORED GEMSTONES IN 2004

| Gemstone | Price range per carat | |
|---|---|---|
| | January[1] | December[2] |
| Amethyst | $7-14 | $7-15 |
| Blue sapphire | 650-1,200 | 685-1,250 |
| Blue topaz | 3-5 | 3-5 |
| Emerald | 1,800-2,800 | 1,900-3,200 |
| Green tourmaline | 45-60 | 45-60 |
| Pearl:[3] | | |
| Cultured saltwater | 5 | 5 |
| Natural | 210 | 210 |
| Pink tourmaline | 60-125 | 60-125 |
| Rhodolite garnet | 18-30 | 18-30 |
| Ruby | 800-1,125 | 800-1,125 |
| Tanzanite | 225-300 | 250-400 |

[1]Source: The Guide, spring/summer 2004, p. 14, 30, 45, 61, 72, 86, 96, 98, 104, 123, and 135. These figures are approximate current wholesale purchase prices paid by retail jewelers on a per stone basis for fine-quality stones.

[2]Source: The Guide, fall/winter 2004-2005, p. 14, 30, 45, 61, 72, 86, 96, 98, 104, 123, and 135. These figures are approximate current wholesale purchase prices paid by retail jewelers on a per stone basis for fine-quality stones.

[3]Prices are per 4.6-milimeter pearl.

TABLE 6
U.S. EXPORTS AND REEXPORTS OF DIAMOND (EXCLUSIVE OF INDUSTRIAL DIAMOND), BY COUNTRY[1]

| Country | 2003 Quantity (carats) | 2003 Value[2] (millions) | 2004 Quantity (carats) | 2004 Value[2] (millions) |
|---|---|---|---|---|
| Exports: | | | | |
| Belgium | 14,200 | $11 | 189,000 | $99 |
| Canada | 78,200 | 47 | 68,500 | 47 |
| Costa Rica | 18,800 | 1 | 31,800 | 3 |
| France | 3,150 | 7 | 16,300 | 11 |
| Germany | 4,790 | 4 | 1,370 | 1 |
| Guatemala | 2,850 | (3) | 5,990 | 1 |
| Hong Kong | 114,000 | 59 | 529,000 | 219 |
| India | 34,900 | 5 | 151,000 | 31 |
| Israel | 38,400 | 39 | 340,000 | 204 |
| Japan | 17,300 | 19 | 22,600 | 26 |
| Mexico | 205,000 | 32 | 397,000 | 124 |
| Netherlands | 307 | 3 | 421 | 3 |
| Netherlands Antilles | 19,000 | 21 | 47,200 | 23 |
| Singapore | 1,590 | 6 | 12,300 | 5 |
| Switzerland | 7,360 | 29 | 18,300 | 47 |
| Thailand | 34,400 | 6 | 68,500 | 15 |
| United Arab Emirates | 9,290 | 3 | 15,700 | 4 |
| United Kingdom | 4,080 | 7 | 26,300 | 28 |
| Other | 92,200 r | 36 r | 58,600 | 39 |
| Total | 699,000 | 335 | 2,000,000 | 932 |
| Reexports: | | | | |
| Armenia | -- | -- | 61,800 | 3 |
| Belgium | 3,860,000 | 1,260 r | 4,140,000 | 1,310 |
| Canada | 124,000 | 64 | 217,000 | 106 |
| Dominican Republic | 78,700 | 12 | 104,000 | 23 |
| France | 16,200 | 30 | 155,000 | 31 |
| Guatemala | 114,000 | 13 | 91,100 | 8 |
| Hong Kong | 2,670,000 | 471 | 2,620,000 | 489 |
| India | 1,420,000 | 234 | 1,710,000 | 335 |
| Israel | 5,700,000 | 1,920 r | 6,340,000 | 2,570 |
| Japan | 185,000 | 46 | 181,000 | 46 |
| Malaysia | 28,800 | 5 | 41,100 | 9 |
| Mexico | 6,980 | 2 | 37,000 | 5 |
| Singapore | 204,000 | 30 | 262,000 | 46 |
| South Africa | 24,600 | 15 | 49,000 | 13 |
| Switzerland | 409,000 | 283 | 518,000 | 285 |
| Thailand | 266,000 | 55 | 284,000 | 70 |
| United Arab Emirates | 220,000 | 57 | 380,000 | 101 |
| United Kingdom | 397,000 | 140 | 487,000 | 171 |
| Other | 51,700 r | 34 r | 93,200 | 46 |
| Total | 15,800,000 | 4,670 r | 17,800,000 | 5,670 |
| Grand total | 16,500,000 | 5,010 r | 19,800,000 | 6,600 |

[r]Revised. -- Zero.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Customs value.
[3]Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 7

U.S. IMPORTS FOR CONSUMPTION OF DIAMOND, BY KIND, WEIGHT, AND COUNTRY[1]

| | 2003 | | 2004 | |
|---|---|---|---|---|
| Kind, range, and country of origin | Quantity (carat) | Value[2] (millions) | Quantity (carat) | Value[2] (millions) |
| Rough or uncut, natural:[3] | | | | |
| Angola | 5,630 | $21 | 6,590 | $19 |
| Australia | 90,000 | 14 | 12,200 | 8 |
| Belgium | 7,160 | 4 | 28,100 | 6 |
| Botswana | 2,850 | 5 | 144,000 | 48 |
| Brazil | 65,100 | 29 | 9,530 | 8 |
| Canada | 13,700 | 18 | 36,500 | 38 |
| Congo (Brazzaville) | 10,400 | 9 | 9,140 | 8 |
| Congo (Kinshasa) | 20,400 | 31 | 20,900 | 17 |
| Guyana | 173,000 | 15 | 157,000 | 16 |
| India | 1,330 | (4) | 34,500 | 3 |
| Israel | 53,200 | 9 | 12,300 | 14 |
| Namibia | 611 | (4) | 28,700 | 1 |
| Russia | 20,000 | 10 | 250,000 | 20 |
| South Africa | 582,000 | 463 | 430,000 | 508 |
| United Kingdom | 441,000 | 61 | 15,300 | 18 |
| Other | 18,200 r | 18 r | 11,500 | 21 |
| Total | 1,500,000 | 707 | 1,210,000 | 753 |
| Cut but unset, not more than 0.5 carat: | | | | |
| Belgium | 775,000 | 282 | 786,000 | 275 |
| Canada | 4,900 | 5 | 4,800 | 4 |
| China | 73,000 | 6 | 67,100 | 10 |
| Congo (Kinshasa) | 3,850 | (4) | 5,920 | (4) |
| Dominican Republic | 12,200 | 1 | 37,200 | 4 |
| France | 65 | (4) | 4,860 | (4) |
| Hong Kong | 374,000 | 59 | 200,000 | 43 |
| India | 10,500,000 | 1,750 | 9,720,000 | 1,770 |
| Israel | 1,050,000 | 525 | 969,000 | 477 |
| Italy | 2,860 | (4) | 3,960 | (4) |
| Mexico | 160,000 | 5 | 14,400 | (4) |
| Russia | 29,400 | 5 | 21,500 | 5 |
| Singapore | 2,710 | 1 | 9,460 | 2 |
| Switzerland | 47,800 | 8 | 7,390 | 2 |
| Thailand | 68,200 | 10 | 189,000 | 36 |
| United Arab Emirates | 198,000 | 31 | 122,000 | 24 |
| United Kingdom | 2,530 | 2 | 4,580 | 2 |
| Other | 47,400 r | 16 r | 37,200 | 16 |
| Total | 13,400,000 | 2,710 | 12,200,000 | 2,670 |
| Cut but unset, more than 0.5 carat: | | | | |
| Belgium | 1,260,000 | 2,310 | 1,230,000 | 2,450 |
| Canada | 15,800 | 51 | 23,600 | 67 |
| France | 3,040 | 11 | 27,800 | 50 |
| Hong Kong | 76,500 | 124 | 71,300 | 111 |
| India | 1,210,000 | 815 | 1,530,000 | 1,080 |
| Israel | 3,000,000 | 5,540 | 3,080,000 | 6,660 |
| Italy | 2,510 | 3 | 4,870 | 5 |
| Namibia | 6 | (4) | 6,010 | 9 |
| Russia | 58,600 | 101 | 62,200 | 121 |
| South Africa | 35,100 | 149 | 40,500 | 242 |
| Switzerland | 15,100 | 158 | 20,100 | 155 |
| Thailand | 19,400 | 17 | 21,300 | 23 |
| United Arab Emirates | 10,200 | 10 | 23,800 | 21 |
| United Kingdom | 16,600 | 95 | 13,800 | 84 |

See footnotes at end of table.

TABLE 7—Continued

U.S. IMPORTS FOR CONSUMPTION OF DIAMOND, BY KIND, WEIGHT, AND COUNTRY[1]

| | 2003 | | 2004 | |
|---|---|---|---|---|
| Kind, range, and country of origin | Quantity (carat) | Value[2] (millions) | Quantity (carat) | Value[2] (millions) |
| Cut but unset, more than 0.5 carat—Continued: | | | | |
| Other | 30,000 r | 68 r | 35,700 | 126 |
| Total | 5,760,000 | 9,460 | 6,190,000 | 11,200 |

[r]Revised.

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

[2]Customs value.

[3]Includes some natural advanced diamond.

[4]Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 8
U.S. IMPORTS FOR CONSUMPTION OF GEMSTONES, OTHER THAN DIAMOND, BY KIND AND COUNTRY[1]

| Kind and country | 2003 Quantity (carats) | 2003 Value[2] (millions) | 2004 Quantity (carats) | 2004 Value[2] (millions) |
|---|---|---|---|---|
| Emerald: | | | | |
| Afghanistan | -- | -- | 5,860 | $1 |
| Belgium | 8,150 | $1 | 25,200 | 2 |
| Brazil | 262,000 | 5 | 355,000 | 4 |
| China | 10,800 | (3) | 227,000 | 1 |
| Colombia | 522,000 | 54 | 677,000 | 47 |
| Germany | 56,900 | 1 | 7,440 | 1 |
| Hong Kong | 101,000 | 5 | 57,100 | 4 |
| India | 1,460,000 | 21 | 1,880,000 | 18 |
| Israel | 128,000 | 23 | 259,000 | 21 |
| Netherlands | -- | -- | 50,200 | (3) |
| South Africa | 16 | (3) | 6,370 | 1 |
| Swaziland | -- | -- | 3,800 | 1 |
| Switzerland | 27,300 | 6 | 9,450 | 7 |
| Thailand | 419,000 | 7 | 424,000 | 8 |
| United Arab Emirates | 11,000 | (3) | 1,200 | (3) |
| Zambia | 214 | (3) | 2,620 | (3) |
| Other | 11,800 r | 3 r | 7,520 | 6 |
| Total | 3,020,000 | 126 | 4,000,000 | 122 |
| Ruby: | | | | |
| Belgium | 8,330 | 1 | 6,450 | 2 |
| Brazil | 13,800 | (3) | 99,300 | (3) |
| China | 4,810 | (3) | 21,700 | (3) |
| Dominican Republic | 28,200 | (3) | 4,920 | (3) |
| Germany | 14,900 | 1 | 19,400 | 1 |
| Hong Kong | 181,000 | 7 | 52,100 | 4 |
| India | 1,910,000 | 5 | 1,300,000 | 4 |
| Israel | 7,190 | 1 | 41,300 | 1 |
| Italy | 2,540 | 2 | 6,570 | (3) |
| Japan | 6,860 | (3) | 25,200 | (3) |
| Netherlands | -- | -- | 50,200 | (3) |
| South Africa | -- | -- | 3,130 | (3) |
| Sri Lanka | 12,500 | 2 | 5,260 | 1 |
| Thailand | 2,260,000 | 47 | 2,090,000 | 43 |
| United Arab Emirates | 31,100 | 1 | 7,700 | 1 |
| Other | 74,400 r | 19 r | 12,100 | 16 |
| Total | 4,550,000 | 87 | 3,750,000 | 72 |
| Sapphire: | | | | |
| Australia | 33,200 r | (3) | 5,300 | (3) |
| Bahrain | -- | -- | 5,930 | (3) |
| Belgium | 10,400 | 1 | 4,480 | 1 |
| China | 12,500 | (3) | 120,000 | (3) |
| Germany | 35,800 | 3 | 41,000 | 2 |
| Hong Kong | 234,000 | 6 | 138,000 | 7 |
| India | 1,150,000 | 5 | 1,040,000 | 9 |
| Israel | 26,500 | 3 | 56,600 | 3 |
| Japan | 287 | (3) | 11,900 | (3) |
| Netherlands | 6,000 | (3) | 50,200 | (3) |
| South Africa | 76 | (3) | 13,300 | (3) |
| Sri Lanka | 314,000 | 30 | 455,000 | 42 |
| Switzerland | 75,100 | 6 | 29,900 | 11 |
| Taiwan | 725 | (3) | 10,700 | (3) |
| Thailand | 6,010,000 | 73 | 5,470,000 | 78 |

See footnotes at end of table.

TABLE 8—Continued

U.S. IMPORTS FOR CONSUMPTION OF GEMSTONES, OTHER THAN DIAMOND, BY KIND AND COUNTRY[1]

| | 2003 | | 2004 | |
|---|---|---|---|---|
| Kind and country | Quantity (carats) | Value[2] (millions) | Quantity (carats) | Value[2] (millions) |
| Sapphire—Continued: | | | | |
| Turkey | -- | -- | 11,200 | (3) |
| United Arab Emirates | 23,200 | 1 | 7,360 | (3) |
| United Kingdom | 21,800 | 3 | 7,820 | 3 |
| Other | 77,600 r | 7 r | 18,900 | 6 |
| Total | 8,040,000 | 136 | 7,500,000 | 163 |
| Other: | | | | |
| Rough, uncut: | | | | |
| Australia | NA | $4 | NA | $3 |
| Brazil | NA | 9 | NA | 8 |
| Canda | NA | 2 | NA | 3 |
| China | NA | 3 | NA | 3 |
| Colombia | NA | 1 | NA | 1 |
| France | NA | 1 | NA | 1 |
| Germany | NA | 3 | NA | 2 |
| Hong Kong | NA | 1 | NA | 1 |
| India | NA | 3 | NA | 1 |
| Mexico | NA | (3) | NA | 1 |
| Netherlands | NA | 1 | NA | 1 |
| Pakistan | NA | 1 | NA | 1 |
| South Africa | NA | 1 | NA | 7 |
| Tanzania | NA | 2 | NA | 1 |
| Thailand | NA | 1 r | NA | 1 |
| Other | NA | 3 r | NA | 4 |
| Total | NA | 35 r | NA | 39 |
| Cut, set and unset: | | | | |
| Australia | NA | 9 r | NA | 9 |
| Austria | NA | 1 | NA | 3 |
| Brazil | NA | 8 | NA | 13 |
| Canada | NA | 1 | NA | 1 |
| China | NA | 34 r | NA | 45 |
| France | NA | 1 | NA | 1 |
| Germany | NA | 32 r | NA | 38 |
| Hong Kong | NA | 32 r | NA | 35 |
| India | NA | 78 r | NA | 82 |
| Israel | NA | 6 | NA | 4 |
| Italy | NA | 1 | NA | 1 |
| Mexico | NA | (3) | NA | 1 |
| South Africa | NA | 1 | NA | 5 |
| Sri Lanka | NA | 5 | NA | 7 |
| Switzerland | NA | 18 r | NA | 10 |
| Taiwan | NA | 2 | NA | 2 |
| Tanzania | NA | 6 | NA | 7 |
| Thailand | NA | 37 r | NA | 46 |
| United Arab Emirates | NA | 1 | NA | 2 |
| Other | NA | 4 r | NA | 8 |
| Total | NA | 277 r | NA | 320 |

[r]Revised. NA Not available. -- Zero.

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

[2]Customs value.

[3]Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 9
VALUE OF U.S. IMPORTS OF LABORATORY-CREATED AND IMITATION GEMSTONES, BY COUNTRY[1,2]

(Thousand dollars)

| Country | 2003 | 2004 |
|---|---|---|
| Laboratory-created, cut but unset: | | |
| Austria | 477 | 2,410 |
| Brazil | 48 | 225 |
| Canada | 123 | 98 |
| China | 10,100 | 14,100 |
| Cyprus | -- | 246 |
| Czech Republic | 5 | 114 |
| France | 881 | 989 |
| Germany | 11,300 | 13,800 |
| Hong Kong | 1,230 | 1,500 |
| India | 530 | 261 |
| Italy | 74 | 75 |
| Japan | 187 | 112 |
| Korea, Republic of | 712 | 649 |
| Netherlands | 35 | 232 |
| Philippines | 95 | 38 |
| Sri Lanka | 1,610 | 1,290 |
| Switzerland | 7,220 | 3,340 |
| Taiwan | 234 | 197 |
| Thailand | 1,180 | 1,090 |
| United Kingdom | 46 | 31 |
| Other | 223 r | 96 |
| Total | 36,300 | 40,900 |
| Imitation:[3] | | |
| Austria | 39,600 | 60,800 |
| China | 2,430 | 4,660 |
| Czech Republic | 6,100 | 7,000 |
| Germany | 1,120 | 974 |
| Hong Kong | 1,140 | 700 |
| India | 567 | 207 |
| Italy | 137 | 100 |
| Japan | 376 | 1,110 |
| Korea, Republic of | 674 | 774 |
| Liechtenstein | -- | 28 |
| Russia | 70 | 53 |
| Spain | 133 | 165 |
| Taiwan | 72 | 220 |
| Thailand | -- | 31 |
| United Arab Emirates | 21 | 62 |
| Other | 339 r | 176 |
| Total | 52,700 | 77,000 |

[r]Revised. -- Zero.

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

[2]Customs value.

[3]Includes pearls.

Source: U.S. Census Bureau.

TABLE 10

U.S. IMPORTS FOR CONSUMPTION OF GEMSTONES[1]

(Thousand carats and thousand dollars)

| | 2003 | | 2004 | |
|---|---|---|---|---|
| Stones | Quantity | Value[2] | Quantity | Value[2] |
| Diamonds: | | | | |
| Rough or uncut | 1,510 r | 707,000 | 1,210 | 753,000 |
| Cut but unset | 19,100 | 12,200,000 | 18,400 | 13,900,000 |
| Emeralds, cut but unset | 3,020 | 126,000 | 4,000 | 122,000 |
| Coral and similar materials, unworked | 5,910 | 11,100 | 6,120 | 11,500 |
| Rubies and sapphires, cut but unset | 12,600 | 222,000 | 11,200 | 234,000 |
| Pearls: | | | | |
| Natural | NA | 601 | NA | NA |
| Cultured | NA | 39,100 | NA | 29,500 |
| Imitation | NA | 2,920 | NA | 3,780 |
| Other precious and semiprecious stones: | | | | |
| Rough, uncut | 1,360,000 | 21,900 | 1,130,000 | 25,200 |
| Cut, set and unset | NA | 241,000 | NA | 279,000 |
| Other | NA | 6,440 | NA | 5,680 |
| Laboratory-created: | | | | |
| Cut but unset | 224,000 | 36,300 | 249,000 | 40,900 |
| Other | NA | 6,920 | NA | 8,110 |
| Imitation gemstone[3] | NA | 49,800 | NA | 73,300 |
| Total | XX | 13,600,000 | XX | 15,500,000 |

[r]Revised. NA Not available. XX Not applicable.

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

[2]Customs value.

[3]Does not include pearls.

Source: U.S. Census Bureau.

TABLE 11

NATURAL DIAMOND: ESTIMATED WORLD PRODUCTION, BY COUNTRY AND TYPE[1, 2, 3]

(Thousand carats)

| Country and type[4] | 2000 | 2001 | 2002 | 2003 | 2004 |
|---|---|---|---|---|---|
| Gemstones: | | | | | |
| Angola | 3,880 r | 4,640 r | 4,520 | 4,500 r | 5,400 |
| Australia | 11,956 5 | 11,779 5 | 15,142 5 | 14,900 | 9,279 5 |
| Botswana | 18,500 | 19,800 | 21,300 | 22,800 | 23,300 |
| Brazil | 1,000 | 700 | 500 | 500 | 500 |
| Canada | 2,534 5 | 3,716 5 | 4,937 r, 5 | 11,200 | 12,618 p, 5 |
| Central African Republic | 348 r | 340 r | 312 r | 250 r | 250 |
| China | 230 | 235 | 235 | 235 | 250 |
| Congo (Kinshasa) | 3,500 | 3,640 | 4,400 | 5,400 | 6,000 |
| Cote d'Ivoire | 210 | 207 | 204 | 152 r | 152 |
| Ghana | 792 | 936 | 770 | 760 r | 800 |
| Guinea | 278 | 273 | 368 | 484 r | 468 |
| Guyana | 82 5 | 179 5 | 248 5 | 413 r, 5 | 450 |
| Liberia | 100 | 100 | 48 | 36 | 18 |
| Namibia | 1,450 | 1,487 5 | 1,562 r, 5 | 1,481 r, 5 | 2,000 |
| Russia | 17,500 r | 17,500 r | 17,400 r | 20,000 r | 21,400 |
| Sierra Leone | 58 | 167 | 147 5 | 250 r | 309 |
| South Africa | 4,320 | 4,470 | 4,350 | 5,070 | 5,780 |
| Tanzania | 301 | 216 | 204 r | 201 r | 305 |
| Venezuela | 29 5 | 14 5 | 46 5 | 11 r, 5 | 40 |
| Zimbabwe | 8 | -- | -- | -- | 16 |
| Other[6] | 24 | 25 | 25 | 24 | 24 |
| Total | 67,100 r | 70,400 r | 76,700 r | 88,700 r | 89,400 |
| Industrial: | | | | | |
| Angola | 431 r | 516 r | 502 | 500 r | 600 |
| Australia | 14,612 5 | 14,397 5 | 18,500 5 | 18,200 | 11,341 5 |
| Botswana | 6,160 | 6,600 | 7,100 | 7,600 | 7,800 |
| Central African Republic | 116 r | 113 r | 104 | 83 r | 83 |
| China | 920 | 950 | 955 | 955 | 960 |
| Congo (Kinshasa) | 14,200 | 14,560 5 | 17,456 5 | 21,600 | 22,000 |
| Cote d'Ivoire | 110 | 102 | 102 | 78 r | 78 |
| Ghana | 198 | 234 | 193 | 190 r | 200 |
| Guinea | 91 | 91 | 123 | 161 r | 157 |
| Liberia | 70 | 70 | 32 | 24 | 12 |
| Namibia | 106 | -- | -- | -- | -- |
| Russia | 11,700 r | 11,700 r | 11,600 r | 13,000 r | 14,200 |
| Sierra Leone | 19 | 56 | 205 5 | 257 r | 304 |
| South Africa | 6,470 | 6,700 | 6,530 | 7,600 | 8,670 |
| Tanzania | 53 5 | 38 5 | 36 r, 5 | 36 r, 5 | 55 |
| Venezuela | 80 5 | 28 5 | 61 5 | 24 r, 5 | 60 |
| Zimbabwe | 15 | -- | -- | -- | 31 |
| Other[7] | 64 | 66 | 68 | 67 | 66 |
| Total | 55,400 r | 56,200 r | 63,600 r | 70,400 r | 66,600 |
| Grand total | 122,000 r | 127,000 r | 140,000 r | 159,000 r | 156,000 |

[p]Preliminary. [r]Revised. -- Zero.

[1]World totals and estimated data are rounded to no more than three significant digits; may not add to totals shown.

[2]Table includes data available through June 3, 2005.

[3]In addition to the countries listed, Nigeria and the Republic of Korea produce natural diamond and synthetic diamond, respectively, but information is inadequate to formulate reliable estimates of output levels.

[4]Includes near-gem and cheap-gem qualities.

[5]Reported figure.

[6]Includes Gabon, India, and Indonesia.

[7]Includes India and Indonesia.