

PLATINUM-GROUP METALS

(Platinum, palladium, rhodium, ruthenium, iridium, osmium)
(Data in kilograms unless otherwise noted)

Domestic Production and Use: The Stillwater and East Boulder Mines in south-central Montana are the only primary platinum-group metals (PGMs) mines in the United States and were owned by one company. Small quantities of PGMs were also recovered as byproducts of copper refining by companies in Texas and Utah. Catalysts for air-pollution abatement continued to be the leading demand sector for PGMs. Catalysts were also used in other air-pollution-abatement processes to remove organic vapors, odors, and carbon monoxide. Chemical uses include catalysts for organic synthesis, production of nitric acid, and fabrication of laboratory equipment. Platinum alloys, in cast or wrought form, are commonly used for jewelry. Platinum, palladium, and a variety of complex gold-silver-copper alloys are used as dental restorative materials.

Salient Statistics—United States:	2003	2004	2005	2006	2007^e
Mine production: ¹					
Platinum	4,170	4,040	3,920	4,290	3,400
Palladium	14,000	13,700	13,300	14,400	13,500
Imports for consumption:					
Platinum	88,500	86,400	106,000	114,000	140,000
Palladium	105,000	127,000	139,000	119,000	105,000
Rhodium	12,000	13,200	13,600	15,900	18,000
Ruthenium	15,900	18,800	23,200	36,000	37,000
Iridium	2,200	3,230	3,010	2,800	3,000
Osmium	53	75	39	56	40
Exports:					
Platinum	22,200	20,000	20,700	45,500	27,000
Palladium	22,300	31,500	27,000	53,100	45,000
Rhodium	479	311	615	1,600	2,000
Other PGMs	145	1,086	1,080	3,390	7,000
Price, ² dollars per troy ounce:					
Platinum	694.44	848.76	899.51	1,144.42	1,260.00
Palladium	203.00	232.93	203.54	322.93	360.00
Rhodium	530.28	983.24	2,059.73	4,561.06	6,060.00
Ruthenium	35.43	64.22	74.41	193.09	610.00
Iridium	93.02	185.33	169.51	349.45	440.00
Employment, mine, number ¹	1,540	1,580	1,620	1,720	1,700
Net import reliance as a percentage of apparent consumption ^e					
Platinum	91	92	93	90	94
Palladium	82	83	84	75	73

Recycling: An estimated 12,700 kilograms of PGMs was recovered from new and old scrap in 2007.

Import Sources (2003-06): Platinum: South Africa, 44%; United Kingdom, 15%; Germany, 11%; Canada, 6%; and other, 24%. Palladium: Russia, 39%; South Africa, 24%; United Kingdom, 16%; Norway, 4%; and other, 17%.

Tariff: All unwrought and semimanufactured forms of PGMs can be imported duty free.

Depletion Allowance: 22% (Domestic), 14% (Foreign).

Government Stockpile:

Stockpile Status—9-30-07³

Material	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposal plan FY 2007	Disposals FY 2007
Platinum	261	—	⁴ 3,110	388	—
Palladium	—	—	⁴ 778	756	—
Iridium	18	—	⁴ 186	254	105

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Events, Trends, and Issues: The desire for an alternative fuel for automobiles has led to a large global public and private effort to develop fuel cell technology. Platinum is the catalyst used by fuel cells to convert hydrogen and oxygen to electricity. An increase in diesel car sales in Europe can be expected to cause a strong increase in use of platinum in the region in 2007 and beyond. The tightening of emissions standards in China, Europe, Japan, and other parts of the world is also expected to lead to higher average platinum loadings on catalysts, especially in light-duty diesel vehicles, as particulate matter emissions become more closely controlled. In the United States, thrifting is continuing at most manufacturers and is likely to lead to a reduction in the use of platinum in autocatalysts. The price differential of about \$900 per troy ounce between platinum and palladium has led to the assumption that automobile manufacturers will change PGMs ratios in gasoline-engine vehicles in favor of palladium. The sales of platinum jewelry are expected to drop worldwide, as the price continues to be high and white gold and palladium are substituted for platinum.

World Mine Production, Reserves, and Reserve Base:

	Mine production				PGMs	
	Platinum		Palladium		Reserves ⁵	Reserve base ⁵
	2006	2007 ^e	2006	2007 ^e		
United States	4,290	3,400	14,400	13,500	900,000	2,000,000
Canada	9,000	8,500	14,000	18,000	310,000	390,000
Colombia	1,100	1,100	NA	NA	(⁶)	(⁶)
Russia	29,000	27,000	98,400	95,000	6,200,000	6,600,000
South Africa	170,000	183,000	85,000	93,000	63,000,000	70,000,000
Zimbabwe	5,100	5,400	4,000	4,400	(⁶)	(⁶)
Other countries	2,190	1,500	8,210	8,100	800,000	850,000
World total (rounded)	221,000	230,000	224,000	232,000	71,000,000	80,000,000

World Resources: World resources of PGMs in mineral concentrations that can be mined economically are estimated to total more than 100 million kilograms. The largest reserves are in the Bushveld Complex in South Africa.

Substitutes: Some motor vehicle manufacturers have substituted palladium for the more expensive platinum in catalytic converters. Until recently, only platinum could be used in diesel catalytic converters; however, new technologies allow palladium to be used. For most other end uses, PGMs can be substituted for other PGMs, with some losses in efficiency. In addition, electronic parts manufacturers are reducing the average palladium content of the conductive pastes used to form the electrodes of multilayer ceramic capacitors by substituting base metals or silver-palladium pastes that contain significantly less palladium.

^eEstimated. NA Not available. — Zero.

¹Estimates from published sources.

²Engelhard Corporation unfabricated metal.

³[See Appendix B for definitions.](#)

⁴Actual quantity will be limited to remaining monetary sales authority or inventory.

⁵[See Appendix C for definitions.](#)

⁶Included with "Other countries."