

PLATINUM-GROUP METALS

(Platinum, palladium, rhodium, ruthenium, iridium, osmium)
(Data in kilograms,¹ unless otherwise noted)

Domestic Production and Use: The United States has only one active platinum-group metals (PGM) mine. The mine, located near Nye, MT, processed about 350,000 metric tons of ore and recovered about 11,000 kilograms of PGM (primarily palladium) in 1997. Small quantities of PGM were also recovered as byproducts of copper refining by two companies in Texas and Utah. The automotive industry is the principal consumer of PGM as oxidation catalysts in catalytic converters to treat automobile exhaust emissions. Oxidation catalysts are also used in many air pollution abatement processes to remove organic vapors, odors, or carbon monoxide. Chemical uses include catalysts for organic synthesis, e.g., in hydrogenation, dehydrogenation, and isomerization. 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. The primary medical use of PGM is in cancer chemotherapy. Other medical uses include platinum-iridium alloys in prosthetic and biomedical devices.

Salient Statistics—United States:	1993	1994	1995	1996	1997^e
Mine production: ² Platinum	2,050	1,960	1,590	1,840	2,500
Palladium	6,780	6,440	5,260	6,100	8,300
Imports for consumption, refined:					
Platinum	57,200	56,500	71,500	75,800	76,000
Palladium	78,900	92,500	124,000	146,000	95,000
Rhodium	7,210	7,820	9,600	9,650	7,000
Ruthenium	4,490	9,880	7,520	15,600	14,000
Iridium	896	926	1,450	1,810	1,500
Osmium	130	55	73	329	100
Exports, refined:					
Platinum	16,100	15,500	15,000	12,700	17,000
Palladium	26,200	29,900	26,000	26,700	43,000
Rhodium	767	791	741	187	100
Price, average daily, New York, dollars per troy ounce:					
Platinum	374.77	411.30	425.36	397.97	394.83
Palladium	122.97	156.20	153.35	130.39	174.09
Rhodium	1,137.36	636.00	463.30	300.00	290.00
Employment, mine, number	400	445	500	500	550

Recycling: An estimated 63 metric tons of PGM was recovered from new and old scrap in 1997.

Import Sources (1993-96): Platinum: South Africa, 60%; Russia, 10%; the United Kingdom, 10%; Germany, 5%; and other, 15%. Palladium: Russia, 47%; South Africa, 22%; the United Kingdom, 10%; Belgium, 8%; and other, 13%.

Tariff: All unwrought and semimanufactured PGM can be imported duty free.

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

Government Stockpile:

Stockpile Status—9-30-97³

Material	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposal plan FY 1997	Disposals FY 1997
Platinum	10,500	—	—	317	317
Palladium	38,800	—	—	470	470
Iridium	920	—	—	—	—

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Events, Trends, and Issues: The only U.S. PGM mine had completed about 75% of a three-stage expansion as of March 31, 1997, and was scheduled to complete the project on schedule by yearend. The mine's annual production of PGM rose from 7,900 kilograms in 1996 to about 11,000 kilograms in 1997. Once the smelter and refinery are completed, the facility will also have the ability to process secondary materials containing PGM, such as autocatalysts.

In August 1997, the Defense National Stockpile Center loaned 3,701 kilograms of 99.95% stockpile platinum to the U.S. Mint for use in its coinage operations. The terms of the agreement, signed August 5, 1997, requires that the Mint will return a like amount of similar quality platinum before the agreement expires in the year 2003. Also in August, the National Defense Stockpile Market Impact Committee published a *Federal Register* notice seeking public comment on the Department of Defense's (DOD) proposed sale of excess material from the National Defense Stockpile. The Committee was considering DOD's proposed new material disposals as well as revisions to current material disposals under the FY 1998 Annual Materials Plan (AMP), which must be approved by Congress. The revised AMP proposed the sale of 9,331 kilograms of palladium and 3,889 kilograms of platinum in fiscal year 1998.

World Mine Production, Reserves, and Reserve Base:

	Mine production				PGM	
	Platinum		Palladium		Reserves ⁴	Reserve base ⁴
	1996	1997 ^e	1996	1997 ^e		
United States ²	1,840	2,500	6,100	8,300	570,000	800,000
Canada	8,260	8,300	5,270	5,300	311,000	380,000
Russia	18,000	18,500	48,000	50,000	6,220,000	6,600,000
South Africa	117,000	117,000	48,900	49,000	62,800,000	69,000,000
Other countries	900	1,200	2,730	3,000	666,000	730,000
World total (rounded)	146,000	148,000	111,000	116,000	70,600,000	77,500,000

World Resources: World resources of PGM in mineral concentrations currently or potentially economic to mine are estimated to be more than 100 million kilograms. The greatest reserves are in South Africa. Currently there are 10 producing mines in the Bushveld Complex. Of these, nine exploit the Merensky Reef and UG2 Chromite Layer and one mine the Platreef, on the northern limb of the complex.

Substitutes: Some automotive companies have substituted palladium for the higher priced platinum in catalytic converters. Although palladium is less resistant to poisoning by sulfur and lead than platinum, it may be useful in controlling emissions from diesel-powered vehicles.

^eEstimated.

¹Multiply by 32.1507 to convert from kilograms to troy ounces.

²Estimates from published sources.

³See Appendix C for definitions.

⁴See Appendix D for definitions.