

## PLATINUM-GROUP METALS

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

**Domestic Production and Use:** Ore containing the platinum-group metals (PGM) was mined, concentrated, and smelted in Montana, and the resultant PGM matte was exported to Belgium for refining and separation of the individual PGM. In addition, refined PGM were recovered as byproducts of copper refining by two companies in Texas and Utah. Secondary metal was refined by about 20 firms, mostly on the east and west coasts. PGM were sold by at least 90 processors and retailers, largely in the Northeast, and were used primarily by the following industries: automotive, electrical and electronic, chemical, and dental and medical. The automotive, chemical, and petroleum-refining industries used PGM mainly as catalysts. The other industries used PGM in a variety of ways that took advantage of their chemical inertness and refractory properties. Domestic mine production of platinum and palladium was valued at \$45 million in 1996.

<b>Salient Statistics—United States:</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996<sup>e</sup></b>
Mine production: <sup>2</sup> Platinum	1,650	2,050	1,960	1,590	1,600
Palladium	5,440	6,780	6,440	5,260	5,000
Imports for consumption: Refined					
Platinum	57,600	57,200	56,500	71,500	70,000
Palladium	61,100	78,900	92,500	124,000	110,000
Rhodium	7,750	7,210	7,820	9,600	10,000
Ruthenium	2,740	4,490	9,880	7,520	20,000
Iridium	207	896	926	1,450	2,000
Osmium	57	130	55	73	600
Exports: Refined					
Platinum	12,100	16,100	15,500	15,000	14,000
Palladium	17,700	26,200	29,900	26,000	24,000
Rhodium	834	767	791	741	300
Price, average daily, New York, dollars per troy ounce:					
Platinum	360.90	374.77	411.30	425.36	410.00
Palladium	89.07	122.97	156.20	153.35	135.00
Rhodium	2,465.24	1,137.36	636.00	463.30	330.00
Employment, mine, number	500	400	445	500	500

**Recycling:** An estimated 60 metric tons of PGM was recovered from new and old scrap in 1996.

**Import Sources (1992-95):** Platinum: South Africa, 61%; United Kingdom, 10%; Russia, 7%; Germany, 4%; and other, 18%. Palladium: Russia, 36%; South Africa, 25%; United Kingdom, 12%; Belgium, 11%; and other, 16%.

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

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

### **Government Stockpile:**

#### Stockpile Status—9-30-96

<b>Material</b>	<b>Uncommitted inventory</b>	<b>Committed inventory</b>	<b>Authorized for disposal</b>	<b>Disposals Jan.-Sept. 96</b>
Platinum	14,100	—	311	—
Palladium	39,300	—	467	—
Iridium	920	—	—	—

In addition to these quantities, the stockpile contains 406 kilograms of nonstockpile-grade platinum and 69 kilograms of nonstockpile-grade palladium.

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**Events, Trends, and Issues:** Domestic mine production of platinum and palladium remained essentially unchanged from the previous year, despite lower average prices for both metals. Domestic PGM consumption increased slightly, owing in part to improved sales of new cars and trucks.

In 1996, the average platinum price decreased, reversing a 5-year trend of gradually rising averages. Through the first 9 months, the price ranged between \$404 and \$462 per troy ounce. Similarly, the average palladium price decreased. During the first 9 months of 1996, palladium prices ranged between \$154 and \$179. Analysts attributed the lower prices in part to increased Russian exports.

### **World Mine Production, Reserves, and Reserve Base:**

	Mine production				PGM	
	Platinum		Palladium		Reserves <sup>3</sup>	Reserve base <sup>3</sup>
	1995	1996 <sup>e</sup>	1995	1996 <sup>e</sup>		
United States <sup>2</sup>	1,590	1,600	5,260	5,000	250,000	780,000
Canada	6,040	6,000	7,100	7,000	250,000	280,000
Russia	18,000	20,000	48,000	50,000	5,900,000	6,000,000
South Africa	118,000	120,000	49,400	50,000	50,000,000	59,000,000
Other countries	<u>1,360</u>	<u>2,000</u>	<u>2,200</u>	<u>2,000</u>	<u>31,000</u>	<u>31,000</u>
World total (rounded)	145,000	150,000	112,000	110,000	56,000,000	66,000,000

**World Resources:** World resources of PGM are estimated to be 100 million kilograms. U.S. resources are estimated to be 9 million kilograms.

**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.

<sup>e</sup>Estimated.

<sup>1</sup>Multiply by 32.1507 to convert from kilograms to troy ounces.

<sup>2</sup>Estimates from published sources.

<sup>3</sup>See Appendix C for definitions.