

# Mercury

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Named after the Roman god of commerce, travel and thievery, mercury has been used for more than 3000 years. Its chemical symbol, Hg, comes from the Latin word *hydrargyrum* meaning “liquid silver.” Also known to many as quicksilver, mercury was known to the ancient Chinese and Hindus before 2000 B.C. It has also been found in tubes in Egyptian tombs dating from about 1500 B.C. The first recorded mention of the metal was by Aristotle in the fourth century B.C. when the heavy, silvery-white metal was used to form amalgams with other metals. It was also used in ointments and cosmetics.

Until the 1960s, mercury was used primarily as a flowing mercury cathode for the electrolysis of an aqueous sodium chloride solution to yield chlorine and caustic soda. Process losses to the environment became a concern and many chlor-alkali plants were either closed or converted to diaphragm cell or ion exchange technologies. Worldwide demand for this application continues to be the single largest use for mercury, but it is declining as older facilities are being closed and replaced with mercury-free technology.

Batteries are another major market for mercury that is experiencing a decline as manufacturers switch to alternative metals. The third but also shrinking market for mercury is in electrical applications. Uses range from metallic mercury switches in thermostats to mercury-vapour discharge lamps. Other uses include dental amalgams, temperature- and pressure-measuring devices, detonators, pigments, and pharmaceuticals. Increased concerns related to the risks of exposure to human health and the environment have led to increased restrictions on the uses of mercury; however, its unique properties will likely guarantee its use in some key sectors, such as energy-efficient fluorescent lamps, for the foreseeable future.

Mercury is a naturally occurring element that is unique amongst the metals in that it is liquid at ambient temperature. At room temperature, mercury is a silvery white

colour. It is solid white below its melting point of  $-38.9^{\circ}\text{C}$  and is a colourless gas above its boiling point of  $356.9^{\circ}\text{C}$ . Mercury exists in nature in some 25 different minerals but is most commonly recovered from the red sulphide mineral known as cinnabar (HgS). Other common mercury ores include corderoite and livingstonite. Native mercury metal exists in nature but is rare. Mercury deposits are generally formed at relatively low temperatures in the world's major orogenic belts.

## MERCURY IN CANADA

Since the closure of the Pinchi Lake mine in 1975, Canada no longer produces primary mercury metal. Mercury has been primarily an imported commodity in Canada. With the increase in concern related to environmental releases of mercury, the use of mercury in Canada continues to decline. In 2003, Canada used a total of 4.9 t of metallic mercury, primarily for applications in electrical apparatus, industrial and control instruments, and for the electrolytic preparation of chlorine at the one remaining chlor-alkali plant for use in the pulp and paper industry. The use of mercury for applications such as gold recovery, industrial chemicals, and paints and pigments has been phased out.

## WORLD DEVELOPMENTS

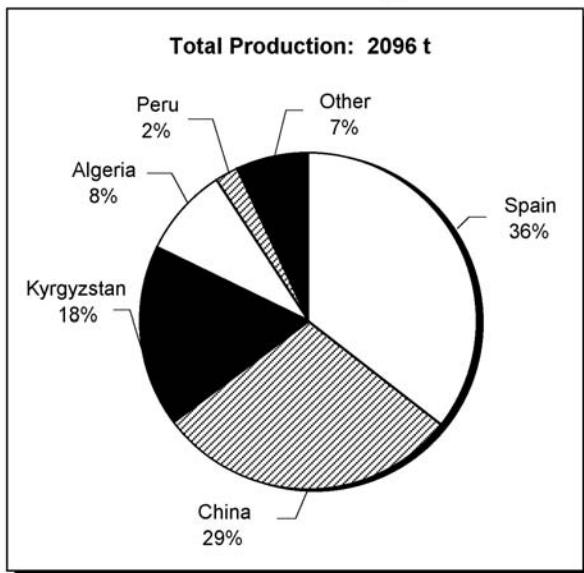
World mine production of mercury was 2096 t in 2003, compared to 2157 t in 2002. Spain was the world's largest producer in 2003 followed by China, Kyrgyzstan and Algeria. Together these four countries accounted for just over 91% of the world's total production of mercury in 2003. With the closure of the mines at Almadén in 2004, Spanish mine production will decline rapidly as stockpiled ore is processed.

In the United States, an estimated 15 t of mercury are recovered as a by-product of gold mining in Nevada, California and Utah. Recycled production greatly outweighs production from primary sources in the United States. Sales of mercury by the Defense Logistics Agency (DLA) from the National Defense Stockpile were suspended in 1994 pending the completion of an analysis of the potential environmental impact of the sales. In March

2004, the Defense National Stockpile Center published a *Final Mercury Management Environmental Impact Statement* outlining three options on how to manage the 4436 t of elemental mercury held at four sites in the DLA inventory: (1) no action (continue mercury storage at current locations); (2) consolidation and storage of mercury at one site; and (3) resumption of mercury sales. In April 2004, a Record of Decision was released announcing that the chosen alternative was to consolidate and store the mercury at one site that is yet to be identified.

Elsewhere in the world, mines in Slovenia, Turkey and the Ukraine remained closed. By-product production from mining continues in Finland, India, Peru, Tajikistan, Mexico, the United States and Chile.

**Figure 1**  
**World Production of Mercury, 2003**



Source: International Consultative Group on Nonferrous Metals Statistics.

## PRICE AND OUTLOOK

The commercial unit for handling mercury is the “flask,” which weighs 34.47 kg (76 lb). Prices increased in 2004 to levels not seen since mercury last peaked in 1988 when it reached US\$335.52/flask and then declined. Mercury prices reached their lowest level in September 1991 at US\$85/flask. The tightness in the mercury market that began in late 2003 continued through 2004 and contributed to higher prices towards the end of the year. Mercury production at Mina de Almadén y Arrayanes SA in Spain was interrupted in the last four months of 2003 through to January 2004 while the company installed a new gas cleaning system.

Elsewhere, flooding in Kyrgyzstan seriously affected mercury production at the country’s mines, while in Algeria production at the Azzaba mine was temporarily stopped while plant upgrades were carried out. It is not expected to re-open until 2005. As a result of these events, *Metal Bulletin’s* reported free market prices for mercury jumped from the US\$180-\$220/flask range (per flask in warehouse) at the start of the year to over US\$320/flask by mid-March and then rose again in September to over US\$400/flask as the full effect of the mine closures took effect. Prices ended the year in the US\$600-\$700/flask range (for lots sold containing 50 flasks or more).

The European Commission put forward a proposal to ban the export of mercury by 2011 as part of its strategy to deal with mercury pollution. The European Union is the largest global exporter of mercury. The Commission is also hoping to reduce pollution by cutting demand through restricting the marketing of mercury-containing products, such as thermometers, while further investigating potential substitutes for remaining uses like dental amalgam. While the plan is not expected to affect prices in the short term, it could spark renewed investments elsewhere, particularly in Asia. Prices are forecast to remain high with some analysts predicting they will reach the US\$1000/flask range in 2005.

*Notes: (1) For definitions and valuation of mineral production, shipments and trade, please refer to Chapter 64. (2) Information in this review was current as of May 31, 2005. (3) This and other reviews, including previous editions, are available on the Internet at [www.nrcan.gc.ca/mms/cmy/com\\_e.html](http://www.nrcan.gc.ca/mms/cmy/com_e.html).*

### NOTE TO READERS

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**TARIFFS**

Item No.	Description	Canada			United States Canada	EU	Japan WTO (2)
		MFN	GPT	USA		Conventional Rate (1)	
2617.90.00.90	Mercury ores and concentrates	Free	Free	Free	Free	Free	Free
2805.40	Mercury	Free	Free	Free	Free	Free-3%	5.4%
2825.90.10.20	Mercury oxides	4%	Free	Free	Free	4.1%	4.8%

Sources: Canadian *Customs Tariff*, effective January 2005, Canada Border Services Agency; *Harmonized Tariff Schedule of the United States*, 2005; *Official Journal of the European Union* (October 30, 2004 Edition); *Customs Tariff Schedules of Japan*, 2004. (1) The customs duties applicable to imported goods originating in countries that are Contracting Parties to the General Agreement on Tariffs and Trade or with which the European Community has concluded agreements containing the most-favoured-nation tariff clause shall be the conventional duties shown in column 3 of the Schedule of Duties. (2) WTO rate is shown; lower tariff rates may apply circumstantially.

**TABLE 1. CANADA, MERCURY TRADE, 2002-04, AND USE, 2001-03**

Item No.	2002		2003		2004 (p)		
	(kg)	(\$000)	(kg)	(\$000)	(kg)	(\$000)	
<b>EXPORTS</b>							
2805.40	Mercury						
	United States	11 254	22	6 420	13	2 335	19
	Saint Pierre and Miquelon	–	–	–	–	9	...
	Total	11 254	22	6 420	13	2 344	19
	Total exports	11 254	22	6 420	13	2 344	19
<b>IMPORTS</b>							
2805.40	Mercury						
	United States	5 638	53	8 086	79	7 192	61
	Argentina	1 040	7	–	–	–	–
	Germany	212	2	–	–	–	–
	Spain	1 388	16	–	–	–	–
	Sweden	–	–	290	3	–	–
	Other	70	...	15	...	46	...
	Total	8 348	78	8 391	82	7 238	61
2825.90.10.20	Mercury oxides						
	United States	675	12	252	4	89	2
	Other	34	1	21	...	32	...
	Total	709	13	273	4	121	2
	Total imports	9 057	91	8 664	86	7 359	63
		<b>2001</b>	<b>2002</b>	<b>2003</b>			
		<b>(kg)</b>					
<b>USE (Metal) (1)</b>							
	Electrical apparatus, industrial and control instruments	x		x		x	
	Electrolytic preparation of chlorine and caustic soda and other uses	x		x		x	
	Total	5 605		2 131		4 865	

Sources: Natural Resources Canada; Statistics Canada.

– Nil; ... Amount too small to be expressed; (p) Preliminary; x Confidential.

(1) Available data as reported by consumers.

Note: Numbers may not add to totals due to rounding.

**TABLE 2. WORLD PRODUCTION OF MERCURY, 1999-2003**

Country	1999	2000	2001	2002	2003
	(tonnes)				
Algeria	240.3	215.6	320.1	307.1	175.6
Chile	25.0	25.0	25.0	25.0	25.0
China	195.0	203.0	193.0	435.0	610.0
Finland	51.1	76.1	71.2	50.6	25.0
India	25.0	25.0	25.0	25.0	25.0
Kyrgyzstan	645.9	550.0	574.4	478.0	370.0
Mexico	15.0	15.0	15.0	15.0	15.0
Morocco	10.0	10.0	10.0	10.0	10.0
Peru	50.0	50.0	50.0	50.0	50.0
Spain	433.0	236.6	524.0	726.1	745.0
Tajikistan	35.0	40.0	40.0	20.0	30.0
United States	15.0	15.0	15.0	15.0	15.0
Total world	1 740.3	1 461.3	1 862.7	2 156.8	2 095.6

Sources: Natural Resources Canada; International Consultative Group on Nonferrous Metal Statistics.