

## HELIUM

(Data in million cubic meters of contained helium gas,<sup>1</sup> unless otherwise noted)

**Domestic Production and Use:** During 2004, the estimated value of Grade-A helium (99.995% or better) extracted domestically by private industry was about \$280 million. Eleven industry plants (seven in Kansas and four in Texas) extracted helium from natural gas and produced only a crude helium product that varied from 50% to 80% helium. Ten industry plants (four in Kansas, one in Texas, and one each in Colorado, New Mexico, Oklahoma, Utah, and Wyoming) extracted helium from natural gas and produced an intermediate process stream of crude helium (about 70% helium and 30% nitrogen) and continued processing the stream to produce a Grade-A helium product. Six industry plants (four in Kansas, one in Oklahoma, and one in Texas) accepted a crude helium product from other producers and the Bureau of Land Management (BLM) pipeline and purified it to a Grade-A helium product. Estimated 2004 domestic consumption of 77 million cubic meters (2.8 billion cubic feet) was used for cryogenic applications, 28%; for pressurizing and purging, 26%; for welding cover gas, 20%; for controlled atmospheres, 13%; leak detection, 4%; breathing mixtures, 2%; and other, 7%.

<b>Salient Statistics—United States:</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004<sup>e</sup></b>
Helium extracted from natural gas <sup>2</sup>	98	87	87	87	85
Withdrawn from storage <sup>3</sup>	29	45	40	35	36
Grade-A helium sales	127	132	127	122	121
Imports for consumption	—	—	—	—	—
Exports <sup>4</sup>	37.0	43.0	40.0	41.0	44.0
Consumption, apparent <sup>4</sup>	89.6	88.9	87.6	80.7	77.0
Employment, plant, number <sup>e</sup>	320	325	325	325	325
Net import reliance <sup>5</sup> as a percentage of apparent consumption	E	E	E	E	E

**Price:** The Government price for crude helium was \$1.947 per cubic meter (\$54.00 per thousand cubic feet) in fiscal year (FY) 2004. The price for the Government-owned helium is mandated by the Helium Privatization Act of 1996 (Public Law 104-273). The estimated price range for private industry's Grade-A gaseous helium was about \$2.16 to \$2.34 per cubic meter (\$60 to \$65 per thousand cubic feet), with some producers posting surcharges to this price.

**Recycling:** In the United States, helium used in large-volume applications is seldom recycled. Some low-volume or liquid boil-off recovery systems are used. In Western Europe and Japan, helium recycling is practiced when economically feasible.

**Import Sources (2000-03):** None.

<b>Tariff: Item</b>	<b>Number</b>	<b>Normal Trade Relations</b>
Helium	2804.29.0010	<u>12-31-04</u> 3.7% ad val.

**Depletion Allowance:** Allowances are applicable to natural gas from which helium is extracted, but no allowance is granted directly to helium.

**Government Stockpile:** Under the Public Law 104-273, the BLM manages the Federal Helium Program, which includes all operations of the Cliffside helium storage reservoir and the Government's crude helium pipeline system. The BLM no longer supplies Federal agencies with Grade-A helium. Private firms that sell Grade-A helium to Federal agencies are required to purchase a like amount of crude helium (in-kind) from the BLM.

In FY 2004, privately owned companies purchased nearly 6.0 million cubic meters (217 million cubic feet) of in-kind crude helium. In addition to this, the privately owned companies also purchased 18.8 million cubic meters (676 million cubic feet) of open market sales helium. During FY 2004, BLM's Amarillo Field Office, Helium Operations (AMFO) accepted about 20.5 million cubic meters (739 million cubic feet) of private helium for storage and redelivered nearly 56.4 million cubic meters (2.032 billion cubic feet). As of September 30, 2004, 56.5 million cubic meters (2.0 billion cubic feet) of helium was owned by private firms.

<b>Material</b>	<b>Stockpile Status—9-30-04<sup>6</sup></b>			<b>Disposal plan FY 2004</b>	<b>Disposals FY 2004</b>
	<b>Uncommitted inventory</b>	<b>Committed inventory</b>	<b>Authorized for disposal</b>		
Helium	753.3	16.6	753.3	63.80	24.80

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**Events, Trends, and Issues:** At the end of FY 2004, some of the major helium producers again announced helium price increases of 8% to 10%. They stated that helium prices were revised because of the rising costs of raw material, labor, health care, insurance premiums, and fuel and transportation costs. It is anticipated that the cost of helium will continue to rise as U.S. helium reserves are depleted. Helium demand will continue to grow slowly, but not at the 5%-per-year rate that was seen the past 10 years. Based on helium export totals through August 2004, it is anticipated that FY 2004 exports will increase by about 7% more than 2003 exports. AMFO continues work on the drafting of helium regulations to provide guidance for the Federal helium program. In early 2003, the AMFO conducted the first open market helium sale. A second open market helium sale was held in the early part of FY 2004. Sales of helium for the two open market offers totaled 65 million cubic meters (2.342 billion cubic feet). In January 2004, one of two overseas helium projects was shut down because of an explosion. The Skikda, Algeria, helium expansion project was shut down after a faulty boiler exploded in the liquefied natural gas complex portion of the refinery. This helium expansion project was designed to increase helium production capacity by 16.6 million cubic meters (600 million cubic feet) per year and had been scheduled to come onstream by mid-2005. The other overseas helium project is a new helium extraction facility under construction in Qatar that is scheduled to start up in early 2006 and to have a helium production capacity of 8.3 million cubic meters (300 million cubic feet) per year.

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

	Production		Reserves <sup>8</sup>	Reserve base <sup>8</sup>
	2003	2004 <sup>e</sup>		
United States (extracted from natural gas)	87	85	3,700	<sup>9</sup> 8,500
United States (from Cliffside Reserve)	35	36	—	—
Algeria	14	14	1,900	8,400
Canada	NA	NA	NA	2,000
China	NA	NA	NA	1,100
Poland	2	2	35	280
Qatar	NA	NA	NA	10,000
Russia	6	6	1,700	6,700
Other countries	NA	NA	NA	2,800
World total (rounded)	144	143	NA	40,000

**World Resources:** The identified helium resources of the United States were estimated to be about 8.5 billion cubic meters (305 billion cubic feet) as of January 1, 2003. This includes 0.87 billion cubic meter (31.4 billion cubic feet) of helium stored in the Cliffside Field Government Reserve (these resources are included in the Reserves and Reserve base figures above), 3.7 billion cubic meters (133 billion cubic feet) of helium in helium-rich natural gas (0.30% helium or more) from which helium is currently being extracted, and 3.1 billion cubic meters (112 billion cubic feet) in helium-lean natural gas (less than 0.30% helium). The Hugoton (Kansas, Texas, and Oklahoma), Panhandle West, Panoma, Riley Ridge, and Cliffside Fields are currently depleting gasfields and contain an estimated 3.6 billion cubic meters (130 billion cubic feet) of helium. Future helium supplies will probably come from known helium-rich natural gas with little fuel value and from helium-lean gas resources.

Helium resources of the world exclusive of the United States were estimated to be about 31.4 billion cubic meters (1.132 trillion cubic feet). The locations and volumes of the principal deposits, in billion cubic meters, are Qatar, 10; Algeria, 8; Russia, 7; Canada, 2; China, 1; Poland, 0.3. As of December 31, 2004, AMFO had analyzed more than 21,500 gas samples from 26 countries and the United States in a program to identify world helium resources.

**Substitutes:** There is no substitute for helium in cryogenic applications if temperatures below -429° F are required. Argon can be substituted for helium in welding, and hydrogen can be substituted for helium in some lighter-than-air applications in which the flammable nature of hydrogen is not objectionable. Hydrogen is also being investigated as a substitute for helium in deep-sea diving applications below 1,000 feet.

<sup>e</sup>Estimated. E Net exporter. NA Not available. — Zero.

<sup>1</sup>Measured at 101.325 kilopascals absolute (14.696 psia) and 15° C, 27.737 cubic meters of helium = 1 Mcf of helium at 70° F and 14.7 psia.

<sup>2</sup>Helium from both Grade-A and crude helium.

<sup>3</sup>Extracted from natural gas in prior years (injected in parentheses).

<sup>4</sup>Grade-A helium.

<sup>5</sup>Defined as imports – exports + adjustments for Government and industry stock changes.

<sup>6</sup>See [Appendix B](#) for definitions.

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<sup>8</sup>See [Appendix C](#) for definitions.

<sup>9</sup>All domestic measured and indicated helium resources in the United States.