

HELIUM

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

Domestic Production and Use: During 2002, the estimated value of Grade-A helium (99.995% or better) extracted domestically by private industry was about \$250 million. There were 11 industry plants (7 in Kansas and 4 in Texas) that extracted helium from natural gas and produced only a crude helium product that varied from 50% to 80% helium. There were 10 industry plants (4 in Kansas, 2 in Texas, and 1 each in Colorado, Oklahoma, Utah, and Wyoming) that 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. There were six industry plants (four in Kansas, one in Texas, and one in Oklahoma) that accepted a crude helium product from other producers and the Bureau of Land Management (BLM) pipeline and purified this to a Grade-A helium product. Estimated 2002 domestic consumption of 80 million cubic meters (2.9 billion cubic feet) was used for cryogenic applications, 24%; for pressurizing and purging, 20%; for welding cover gas, 18%; for controlled atmospheres, 16%; leak detection, 6%; breathing mixtures, 3%; and other, 13%.

Salient Statistics—United States:	1998	1999	2000	2001	2002^e
Helium extracted from natural gas ²	114	114	98	87	85
Withdrawn from storage ³	(0.7)	3	29	45	40
Grade-A helium sales	112	117	127	132	125
Imports for consumption	—	—	—	—	—
Exports ⁴	27.8	26.8	37.0	43.0	40
Consumption, apparent ⁴	84.6	90.3	89.6	88.9	80.0
Employment, plant, number ^e	530	500	320	325	325
Net import reliance ⁵ as a percentage of apparent consumption	E	E	E	E	E

Price: The Government price for crude helium was \$1.857 per cubic meter (\$51.50 per thousand cubic feet) in fiscal year (FY) 2002. The price for the Government-owned helium is mandated by Public Law 104-273. The estimated price range for private industry's Grade-A gaseous helium was about \$1.62 to \$1.87 per cubic meter (\$45 to \$52 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 (1998-2001): None.

Tariff: Item	Number	Normal Trade Relations 12/31/02
Helium	2804.29.0010	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 Helium Privatization Act of 1996 (Public Law 104-273), the BLM operates the Federal Helium Program, including a helium storage system. The BLM no longer supplies Federal agencies with Grade-A helium. Private firms that sell Grade-A helium to the Federal agencies are required to purchase a like amount of crude helium (in-kind) from the BLM. In FY 2002, privately owned companies purchased nearly 6.32 million cubic meters (228 million cubic feet) of in-kind crude helium. During FY 2002, BLM's Amarillo Field Office, Helium Operations (AMFO) accepted more than 17.5 million cubic meters (630 million cubic feet) of private helium for storage and redelivered nearly 57.0 million cubic meters (2,054 million cubic feet). As of September 30, 2002, 52.3 million cubic meters (1.9 billion cubic feet) of helium was owned by private firms.

Stockpile Status—9-30-02⁶

Material	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposal plan FY 2002	Disposals FY 2002
Helium	807.2	16.6	807.2	6.66	6.32

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Events, Trends, and Issues: During 2002, BOC Gases, Inc., Air Products and Chemicals Inc., and Praxair, Inc., again announced helium price increases. As in 2001, the price increases were again in response to the continued rising costs of purchasing, producing, and distributing helium. The higher costs for helium are due to the continued increase in worldwide helium demand, which has shifted helium supply to higher cost sources such as the Federal helium reserve. It is anticipated that the trend toward higher costs will continue as the potential for helium shortages increases. Helium shortages will result from continued depletion of U.S. helium reserves as demand for helium continues to escalate. It is anticipated that helium demand will grow at a rate of about 5% per year through 2004; helium demand has risen at this rate for the past 10 years. However, during 2002, there was a slight decrease in helium exports, which could lead to some slowdown in the demand growth.

In 2001, the AMFO initiated work on the drafting of helium regulations to provide guidance for the Federal helium program. Drafting of the regulations continued during 2002.

World Production, Reserves, and Reserve Base:

	Production		Reserves ⁸	Reserve base ⁹
	2001	2002 ^e		
United States	87	85	4,100	⁹ 8,900
Algeria	14	14	2,000	3,000
Canada	NA	NA	NA	2,000
China	NA	NA	NA	1,100
Poland	1	1	40	280
Russia	4	4	1,700	6,700
Other countries	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>2,800</u>
World total (rounded)	106	104	NA	25,000

World Resources: The identified helium resources of the United States were estimated to be about 8.9 billion cubic meters (323 billion cubic feet) as of January 1, 2001. This includes 0.95 billion cubic meters (34.3 billion cubic feet) of helium stored in the Cliffside Field, 4.1 billion cubic meters (147 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 (111 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 4.0 billion cubic meters (143 billion cubic feet) of helium. Future supplies will probably come from known helium-rich natural gas with little fuel value and from helium-lean resources.

Helium resources of the world exclusive of the United States were estimated to be about 16.1 billion cubic meters (580 billion cubic feet). The locations and volumes of the principal deposits, in billion cubic meters, are Russia, 7; Algeria, 3; Canada, 2; China, 1; and Poland, 0.3. As of December 31, 2002, AMFO had analyzed more than 21,100 gas samples from 26 countries and the United States in a program to identify world helium resources.

Substitutes: There is no substance that can be substituted 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.

^eEstimated. E Net exporter. NA Not available. — Zero.

¹Measured 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.

²Helium from both Grade-A and crude helium.

³Extracted from natural gas in prior years (injected in parentheses).

⁴Grade-A helium.

⁵Defined as imports - exports + adjustments for Government and industry stock changes.

⁶See Appendix B for Definitions.

⁷Team Leader, Resources Evaluation, Bureau of Land Management Amarillo Field Office, Helium Operations, Amarillo, TX.

⁸See Appendix C for definitions.

⁹All domestic measured and indicated helium resources in the United States.