

## HELIUM

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

**Domestic Production and Use:** The estimated value of Grade-A helium (99.995% or better) extracted domestically during 2008 by private industry was about \$640 million. Nine industry plants (five 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, and one each in Colorado, New Mexico, Oklahoma, Texas, 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 2008 domestic consumption of 64.9 million cubic meters (2.34 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>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008<sup>e</sup></u>
Helium extracted from natural gas <sup>2</sup>	86	76	79	77	78
Withdrawn from storage <sup>3</sup>	44	57	58	61	53
Grade-A helium sales	130	133	137	138	131
Imports for consumption	—	—	—	—	—
Exports <sup>4</sup>	44.9	51.4	61.9	64.2	66.1
Consumption, apparent <sup>4</sup>	85.1	81.6	75.2	73.5	64.9
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 \$2.18 per cubic meter (\$60.50 per thousand cubic feet) in fiscal year (FY) 2008. 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 \$4.15 to \$4.87 per cubic meter (\$115 to \$135 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 boiloff recovery systems are used. In Western Europe and Japan, helium recycling is practiced when economically feasible.

**Import Sources (2004-07):** None.

<b>Tariff: Item</b>	<b>Number</b>	<b>Normal Trade Relations</b>
Helium	2804.29.0010	<u>12-31-08</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 Public Law 104-273, the BLM manages the Federal Helium Program, which includes all operations of the Cliffside Field helium storage reservoir, in Potter County, TX, 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 (in-kind) crude helium from the BLM.

In FY 2008, privately owned companies purchased about 5.7 million cubic meters (207 million cubic feet) of in-kind crude helium. In addition to this, privately owned companies also purchased 46.2 million cubic meters (1,664 million cubic feet) of open market sales helium. During FY 2008, BLM's Amarillo Field Office, Helium Operations (AMFO), accepted about 19.9 million cubic meters (717 million cubic feet) of private helium for storage and redelivered nearly 72.6 million cubic meters (2,617 million cubic feet). As of September 30, 2008, about 31.3 million cubic meters (1,129 million cubic feet) of privately owned helium remained in storage at Cliffside Field.

<b>Material</b>	<b>Stockpile Status—9-30-08<sup>6</sup></b>			
	<b>Uncommitted inventory</b>	<b>Authorized for disposal</b>	<b>Disposal plan FY 2008</b>	<b>Disposals FY 2008</b>
Helium	541.6	541.6	63.8	51.9

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**Events, Trends, and Issues:** During FY 2008, most helium suppliers announced price increases that averaged about 30%. These increases were in response to continued increased raw material, energy, and distribution costs. Some companies increased high-pressure cylinder rental charges, and others continued cost-recovery efforts through various charges and surcharges. The price of pure helium is expected to continue to increase as production costs, including the price of crude helium, increase and helium reserves are depleted. Helium demand is expected to continue to grow at about 2.5% to 3.5% per year. Helium exports are expected to increase by about 3% from 2007 exports. During FY 2008, the AMFO conducted four open market helium sales. Sales totaled 46.2 million cubic meters (1,664 million cubic feet). During 2008, the Skikda, Algeria, and Qatar helium plants, which came onstream in late 2005, operated and produced helium at much better rates than during 2007. These two plants are expected to produce about 40% to 75% of their nameplate capacities during 2008. Worldwide, nine new helium plant projects are scheduled for startup sometime between 2009 and 2015. Two projects are scheduled for startup in the U.S. during 2011-12 in the Riley Ridge, WY, and St. Johns, AZ, areas. The other plants will be in Algeria, Australia, China, India, Indonesia, Qatar, and Russia.

**World Production, Reserves, and Reserve Base:** Reserves and reserve base numbers were revised based on estimated production for 2008.

	Production		Reserves <sup>8</sup>	Reserve base <sup>8</sup>
	2007	2008 <sup>e</sup>		
United States (extracted from natural gas)	77	78	4,000	<sup>9</sup> 20,000
United States (from Cliffside Field)	61	53	( <sup>10</sup> )	( <sup>10</sup> )
Algeria	16	16	1,800	8,200
Canada	NA	NA	NA	2,000
China	NA	NA	NA	1,100
Poland	2.5	2.5	24	280
Qatar	7.1	12.5	NA	10,000
Russia	7.1	6.9	1,700	6,800
Other countries	NA	NA	NA	800
World total (rounded)	171	169	NA	49,000

**World Resources:** As of December 31, 2006, the total helium reserves and resources of the United States were estimated to be 20.6 billion cubic meters (744 billion cubic feet). This includes 4.25 billion cubic meters (153.2 billion cubic feet) of measured reserves, 5.33 billion cubic meters (192.2 billion cubic feet) of probable resources, 5.93 billion cubic meters (213.8 billion cubic feet) of possible resources, and 5.11 billion cubic meters (184.4 billion cubic feet) of speculative resources. Included in the measured reserves are 0.67 billion cubic meters (24.2 billion cubic feet) of helium stored in the Cliffside Field Government Reserve, and 0.065 billion cubic meters (2.3 billion cubic feet) of helium contained in Cliffside Field native gas. The Hugoton (Kansas, Oklahoma, and Texas), Panhandle West, Panoma, Riley Ridge, and Cliffside Fields are the depleting fields from which most U.S.-produced helium is being extracted. These fields contain an estimated 2.7 billion cubic meters (96 billion cubic feet) of helium.

Helium resources of the world exclusive of the United States were estimated to be about 31.3 billion cubic meters (1.13 trillion cubic feet). The locations and volumes of the major deposits, in billion cubic meters, are Qatar, 10.1; Algeria, 8.2; Russia, 6.8; Canada, 2.0; and China, 1.1. As of December 31, 2008, AMFO had analyzed over 21,900 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  $-429^{\circ}$  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  $15^{\circ}$  C; 27.737 cubic meters of helium = 1 Mcf of helium at  $70^{\circ}$  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.

<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, probable, possible, and speculative helium resources in the United States.

<sup>10</sup>Included in United States (extracted from natural gas) reserves and reserve base.