

## Lecture Bottles Purchase & Disposal

Lecture bottles are small compressed gas cylinders, typically 2-3 inches in diameter and 12-18 inches in height. While most gas suppliers offer lecture bottles for purchase most will not accept the empty or partly full cylinders back for disposal.

Lecture bottle disposal can be very costly depending on the original content (see attachment for disposal cost estimate for gases commonly used in the department).

It is very important to note that the Environmental Services Facility (which manages and handles the hazardous and biohazardous waste from UBC, does not accept lecture bottles. Therefore, the cost of disposal must be borne by the department.

In order to avoid costly disposal fees and potential hazards involved in emptying and cutting cylinders, **purchase only returnable lecture bottles or small size cylinders.**

The following vendors offer returnable lecture bottles and/or small size cylinders:

### **A. Air Liquide Canada Inc.**

Air Liquide's Specialty Gas Catalogue link is as follows:

<http://www.ca.airliquide.com/en/business/industry/laboratories/specgas/index.asp>

In small cylinders, they have two options:

1. **Calgaz cylinders**, which are small disposable cylinders, often used with gas detectors. The various sizes of Calgaz cylinders can be found near the bottom of the Catalogue Web page. (A small fee will be charged to return these cylinders). Here is some information from their Web page:

#### **CALGAZ™**

CALGAZ™ non-refillable cylinders are a more convenient, more cost efficient way of utilizing specialty gases and gas mixtures. These smaller-sized, lightweight cylinders require no deposit or demurrage. They are easy to handle and use very little space. They also eliminate over-purchasing when only small quantities are necessary.

There is a large variety of specialty gases and mixtures available. Each is precisely mixed and certified to exacting standards

Air Liquide Canada also offers a complete line of auxiliary equipment. You can be assured of the same high level of quality in our portable calibration kits, regulators and needle valves

The CALGAZ™ label is your guarantee that you are getting the precise gas, dispensing equipment and cylinder size you need.

2. **Specialty Gas Catalogue Small refillable cylinders, size 1A (new) or 2.**

The Cylinder Description Table near the top of the Catalogue web page shows you the various sizes of refillable cylinders. Note that the smallest size (1A) is newest size available and is not listed on this page. Here is some information from their Web page:

#### **Specialty Gas Catalogue**

Air Liquide Canada Inc. is one of the country's largest specialty gas suppliers. Our three production facilities located in Edmonton, Bramalea and Montreal, and our 10 Customer Centers across the country ensure you of quick, reliable service. Under the trade name ALPHAGAZ™, we supply a complete spectrum of products, including pure and ultra-

pure specialty gases, as well as gas and liquid mixtures. Every precaution is taken to make sure that you get only top quality product, from careful cylinder preparation and an efficient filling process to an excellent quality control system. Our team of experts ensures an accurate analysis of every product.

We are pleased to introduce to you our new on-line specialty gas catalogue. It has been improved and updated, making it easier for you to quickly find exactly what you need. You will also find useful technical information that can help you with your processes.

Whatever your requirements are regarding specialty gases and gas mixtures, you can rely on our innovative application of gas technology to meet your needs. You are our top priority.

Thank you for considering Air Liquide Canada as your specialty gas supplier. For more information, try these Air Liquide hypertexts:

[Cylinder description table](#)  
[Gas grade selection table](#)      [CGA Connections table](#)

You can also contact Jeni Stafford, Specialty Gas Sales at 604- 787- 4990 for more information

## **B. Spectra Gases**

Refer to the attached list of lecture bottles available from Spectra Gas Products. They will accept back empty and partially empty lecture bottles.

You can contact Stephane Frappier , Canadian Sales Manager for more information at 1-800-932-0611

## **C. Praxair Canada**

Praxair has small size refillable cylinders -N9- 4.4 in diameter, 17.4 in height. Please refer to web page <http://www.praxair.com> for type of gases available. Some information from their web page is as follows:

### **Praxair**

Whether it's oxygen for chemical or pharmaceutical manufacturers, or a rare gas such as krypton, neon or xenon for lighting, lasers, or medical imaging, Praxair can supply it. Praxair is a technology pioneer and a global leader in the industrial gases industry. Select a gas from the list below for more information about gas applications and supply options

#### **Levels of purity that match your requirements**

A full range of purities - for certain applications, up to 99.9999 percent - is available. We know consistent quality is critical for every customer. Praxair's [Quality Assurance Program](#) is certified to ISO 9002 standards.

#### **Gas delivered to meet your needs**

Whether your needs are for gaseous or liquid gases purchased in cylinders, delivered in bulk, prepared on site or carried through a pipeline, Praxair can deliver. Our systems can help you monitor critical equipment, predict future plant conditions, and integrate gas supply with your processes for optimum efficiency and reliability.

#### **More information about ordering products and services**

Visit our [Customer Connection](#) page for contacts, tools and information on packaged, bulk, and on-site gas. It's also the place to find out what we're doing in your [industry](#) and [worldwide](#)

**Atmospheric Gases:  
Applications:**

[Argon](#)  
[Nitrogen](#)  
[Oxygen](#)

**Process Gases:**

[Acetylene](#)  
[Carbon Dioxide](#)  
[Carbon Dioxide \(Dry Ice\)](#)  
[Carbon Monoxide](#)  
[Helium](#)  
[Hydrogen](#)

**Gases & Mixtures for Specific**

[Medical Gases](#)  
[Semiconductor Gases](#)  
[Specialty Gases](#)  
[Welding & Cutting Gases](#)

**Rare Gases**

[Neon](#)      [Krypton](#)      [Xenon](#)

This information will be posted also on the department safety web page. Let me know if you have any questions or you wish more information

Noga Levit

Chemistry Department Safety Officer

### List of Lecture Bottle for Disposal

<b>Gas Name</b>	<b>Estimated Disposal Cost</b>
13C-carbon monoxide	\$29.00
Allene	\$75.00
Anhydrous ammonia	\$135.00
Boron trichloride	\$425.00
Boron trifluoride	\$425.00
Bromo-methane-d3	\$135.00
chlorine	\$135.00
Chloro-methane	\$135.00
Deuterated ammonia	\$135.00
Deuterated methane	\$75.00
Deuterium	\$75.00
Deuterium chloride	\$425.00
Deuterium Fluoride	\$425.00
Deuterium hydride	\$425.00
Diiso-butyl aluminum chloride	\$1750.00
Ethyl fluoride	\$740.00
Ethylene-d4	\$75.00
Germane	\$425.00
Hydrogen bromide	\$135.00
Hydrogen chloride	\$135.00
Hydrogen fluoride	\$740.00
Hydrogen sulfide	\$135.00
krypton	\$29.00
Methyl ether	\$75.00
Neon-20	\$29.00
nitrogen	\$29.00
Nitrogen dioxide	\$135.00
Nitrous oxide	\$75.00
oxygen	\$29.00
phosphine	\$740.00
Propyne	\$75.00
Silane	\$740.00
Sulfur dioxide	\$135.00
Sulfur tetra fluoride	\$425.00
Trans-2-but-ene	\$75.00
Triethyl borane	\$740.00
Trimethyl amine	\$135.00
vanadium chloride	\$740.00
Vinyl acetylene in xylene	\$425.00
Vinyl bromide	\$425.00
xenon	\$29.00



# GAS PRODUCTS

## Pure Gases

AIR (not sold for breathing use)	
AMMONIA, Anhydrous	(NH <sub>3</sub> )
AMMONIA, Anhydrous (isotopic)	( <sup>2</sup> H <sub>3</sub> )
ARGON	(Ar)
Boron Trifluoride	(BF <sub>3</sub> )
BROMINE	(Br <sub>2</sub> )
Bromotrifluoromethane (FREON-13B1)	(CBrF <sub>3</sub> )
CARBON DIOXIDE	(CO <sub>2</sub> )
CARBON DIOXIDE <sup>12</sup> C	( <sup>12</sup> CO <sub>2</sub> )
CARBON DIOXIDE <sup>13</sup> C	( <sup>13</sup> CO <sub>2</sub> )
CARBON DIOXIDE <sup>18</sup> O	(C <sup>18</sup> O <sub>2</sub> )
CARBON MONOXIDE	(CO)
CARBON MONOXIDE <sup>12</sup> C	( <sup>12</sup> CO)
CARBON MONOXIDE <sup>13</sup> C	( <sup>13</sup> CO)
Chlorine	(Cl <sub>2</sub> )
Chlorine Trifluoride	(ClF <sub>3</sub> )
Chlorotrifluoromethane (FREON-13)	(CClF <sub>3</sub> )
DEUTERATED AMMONIA	(ND <sub>3</sub> )
Deuterated Methane	(CD <sub>4</sub> )
DEUTERATED SILANE	(SiD <sub>4</sub> )
DEUTERIUM	(D <sub>2</sub> )
Deuterium Chloride	(DCl)
Dichlorodifluoromethane(FREON-12)	
DIFLUOROMETHANE(Refrigerant R-32)(Methylene Fluoride)	(CH <sub>2</sub> F <sub>2</sub> )
DISILANE (Silicon Hydride)	(Si <sub>2</sub> H <sub>4</sub> )
Ethane	
FLUORINE	(F <sub>2</sub> )
Formaldehyde(gaseous 1-20ppm, bal N <sub>2</sub> )	
HELIUM	(He)
HELIUM-3	( <sup>3</sup> He)
HYDROGEN	(H <sub>2</sub> )
HYDROGEN BROMIDE	(HBr)
HYDROGEN CHLORIDE	(HCl)
HYDROGEN FLUORIDE	(HF)
KRYPTON	(Kr)

20 Aurora-Lafleur,  
Gatineau, QC,  
J8Z 3N2  
Toll free: 1-800-932-0611  
Phone: (819) 772-4398 Fax: (819) 772-4716



## Pure Gases (cont'd)

KRYPTON-78	( <sup>78</sup> Kr)
KRYPTON-82	( <sup>82</sup> Kr)
KRYPTON-84	( <sup>84</sup> Kr)
KRYPTON-86	( <sup>86</sup> Kr)
METHANE	(CH <sub>4</sub> )
METHANE <sup>12</sup> C	( <sup>12</sup> CH <sub>4</sub> )
METHANE <sup>13</sup> C	( <sup>13</sup> CH <sub>4</sub> )
NEON	(Ne)
NEON-20	( <sup>20</sup> Ne)
NEON-22	( <sup>22</sup> Ne)
Nitric Oxide	(NO)
NITROGEN[gaseous]	(N <sub>2</sub> )
NITROGEN TRIFLUORIDE	(NF <sub>3</sub> )
Nitrous Oxide	(N <sub>2</sub> O)
Octafluorocyclobutane	(C <sub>4</sub> F <sub>8</sub> )
OXYGEN	(O <sub>2</sub> )
Propane	
SILANE (Silicon Tetrahydride)	(SiH <sub>4</sub> )
SULFUR HEXAFLUORIDE	(SF <sub>6</sub> )
TETRAFLUOROMETHANE(Carbon Tetrafluoride) (Freon14)	(CF <sub>4</sub> )
XENON	(Xe)
XENON-124	( <sup>124</sup> Xe)
XENON-129	( <sup>129</sup> Xe)
XENON-131	( <sup>131</sup> Xe)
XENON-132	( <sup>132</sup> Xe)
XENON-134	( <sup>134</sup> Xe)
XENON-136	( <sup>136</sup> Xe)
XENON DIFLUORIDE	(XeF <sub>2</sub> )



## Environmental Mixes

1601	Ammonia mixes
1602a	Benzene(<3ppm) in N <sub>2</sub>
1602b	Benzene(3-5000ppm) in N <sub>2</sub>
1603	Butadiene mixes
1604	Butane mixes
1605a	Carbon Dioxide (4000ppm-50%) in N <sub>2</sub>
1605b	Carbon Dioxide (2500ppm-50%) in Air
1606a	Carbon Monoxide (25ppm-10%) in N <sub>2</sub>
1606b	Carbon Monoxide (25ppm-10%) in Air
1607	Ethylene Oxide mixes
1608	Hexane mixes
1609a	Hydrogen Sulfide (5-1000ppm) in N <sub>2</sub>
1609b	Hydrogen Sulfide (5-1000ppm) in Air
1610	Bromochloromethane[BrCH <sub>2</sub> Cl](less than 3000ppm),in N <sub>2</sub> and/or He
1611a	Nitric Oxide(12ppm - <2.3%) in N <sub>2</sub>
1612a	Nitrogen Dioxide(1-5000ppm) in N <sub>2</sub>
1612b	Nitrogen Dioxide(1-5000ppm) in Air
1613	Nitrous Oxide mixes
1614	Pentane mixes
1615	Propane mixes
1616	Sulfur Dioxide
1616a	Sulfur Dioxide(<2%) in N <sub>2</sub>
1617	Toluene mixes
1618	Vinyl Chloride mixes
1619	Chlorobenzene-D5 (C <sub>6</sub> ClD <sub>5</sub> ) (less than 300ppm), in N <sub>2</sub> and/or He
1620	1,4-Difluorobenzene ( C <sub>6</sub> H <sub>4</sub> F <sub>2</sub> ) (less than 150ppm), in N <sub>2</sub> and/or He
1621	Oxygen (1-21%) in Nitrogen
1622	Propane (less than 2%) in Nitrogen or Air