

# Airgas<sup>®</sup>

## Safety Booklet



# Airgas<sup>®</sup>

You'll find it with us.

**Airgas, Inc.**

259 North Radnor-Chester Road

Suite 100

Radnor, PA 19087-5283

(610) 687-5253 FAX: (610) 687-1052

800-255-2165

[www.airgas.com](http://www.airgas.com)

*For the Safe Handling  
and Transportation of  
Compressed Gases*

## Things you should know before handling or transporting compressed gas cylinders.

Did you know that all compressed gases are labeled hazardous materials simply because they're under pressure? Many gases are also considered hazardous materials because of the properties of the gas contained in the cylinder. Since all compressed gases are classified as a hazardous material, specific training on federal and state regulations covering the safe handling and transportation of compressed gases should be provided to you by your manager or employer before you ever touch a compressed gas cylinder. You should also receive training by your manager or employer concerning the nature and properties of any specific gas you are handling, or may be required to handle.

*Note: Reading the information in this pamphlet is not a substitute for your training, nor is it to be used as a replacement reference for state and federal laws and regulations. It simply presents brief highlights of some of the more common compressed gas handling procedures that are industry standards.*

- ◆ FREE INFORMATION on specific compressed gases are contained in publications called **Material Safety Data Sheets**, or the "MSDS." These are available from your point of product purchase, or can be **downloaded from the Airgas Website at [www.airgas.com](http://www.airgas.com)**. Please take advantage of Airgas' MSDS service and become informed of the potential dangers associated with each compressed gas you purchase from us.
- ◆ *The Compressed Gas Association (CGA)* offers publications on handling compressed gases, such as, Pamphlet P-1, Safe Handling of Compressed Gases in Containers. They also sell videos on the subject of compressed gases. The CGA Website is [www.cga.com](http://www.cga.com).
- ◆ Whatever you do, don't hesitate to ask questions. We want to help, and we want you to be safe.

## Handling Compressed Gases

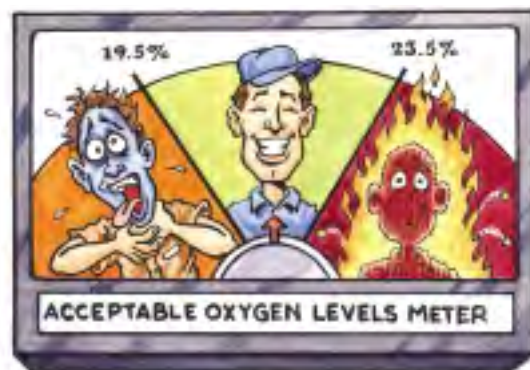
Compressed gases are capable of creating environments that are explosive, reactive, flammable, oxidizing, oxygen deficient, extremely cold, corrosive or otherwise extremely hazardous to health, depending upon the product contained in the cylinder.

Most compressed gas cylinders are very heavy, and remain so whether they are empty or full, as their contents are in gaseous form and weigh very little. Cylinders containing product in liquid form are extremely heavy when full, but less so when empty. Acetylene cylinders are designed with a heavy filler material in addition to the gas product itself. The safest way to move any cylinder is with a cylinder cart.

Medical gases, or gases that are intended for human consumption, must be handled by personnel with specific training on such gases. For example, gases such as *Breathing Air* are marked to indicate they are specifically for breathing, however, most gases are not intended for human consumption in any form.

### A few facts about oxygen:

- ◆ Did you know that Oxygen is NOT "Air", and Air is not "Oxygen"? Air is comprised of only 21% Oxygen.
- ◆ Normal Oxygen concentration in the Air we breathe is about 21%.



- ◆ Oxygen has a very narrow acceptable range of safety, and studies have determined that it becomes dangerous to all humans if Oxygen levels drop below 19.5% (OSHA classifies this as an "IDLH" situation, which means it is Immediately Dangerous to Life and Health.)

- ◆ Depending on an individual's lung efficiency, and other factors, an individual may suffer ill effects even before the critical 19.5% level.
- ◆ The lower the Oxygen concentration drops, the more difficult it is to sustain life. OSHA has also determined that too much Oxygen in the air (over 23.5%) is dangerous because it creates an Oxygen enriched atmosphere.
- ◆ Fuels become more volatile in an Oxygen rich atmosphere and will cause a fire to burn more rapidly, intensely and often violently. For this reason, you should never allow a gas to be released into an enclosed space or room, as this could change the Oxygen concentration of the atmosphere. This is one of the reasons ventilation and air monitoring is important to ensure the atmosphere in confined spaces is safe in all respects for human entry.

Due to the number of reported cases of their abuse, **Nitrous Oxide and Helium** are two gas products that are of particular concern to the Compressed Gas Industry. Unfortunately, many of these reports come from state coroner offices, as neither gas is capable of supporting life. Inhalation of Helium has been depicted in TV shows and movies to cause the inhaler's voice to temporarily change in pitch. *This is an extremely dangerous act and should never be done.* The human body carries little or no oxygen reserve in the bloodstream, and it is very easy to deplete the oxygen level, causing asphyxiation. Persons who breathe non-life supporting gases can be overcome and die even if they're given mouth-to-mouth resuscitation. A study conducted by the European Industrial Gas Association ([www.eiga.org](http://www.eiga.org)) indicates that some people can become overcome with a single breath of inert gas.



## A few Do's and Don'ts for handling compressed gases:

Familiarize yourself when storing flammable gases as to whether or not the product is heavier or lighter than air. Consider how a leak might travel to an ignition source.



**ALWAYS** wear safety glasses with side shields when handling or working around compressed gases.

**ALWAYS** return cylinders to your supplier with

approximately 25

pounds per square inch of pressure. By following this rule you will help prevent cylinder contamination. If you believe a cylinder has become contaminated, tell your gas supplier.

**ALWAYS** move cylinders by using a specifically designed cylinder cart.

**ALWAYS** wear the proper personal protective equipment (PPE) for the job. For example, wear protective clothing, helmet, face shield, lens, safety shoes and leather gloves when cutting or welding.

**ALWAYS** securely apply protective valve caps on cylinders when idle or in transport. Many cylinders contain pressures in excess of 2000 pounds per square inch or more. A broken valve resulting from a falling cylinder is all it takes for the cylinder to become an unguided missile. Also, any uncontrolled release of gas under pressure can be dangerous.





**ALWAYS** keep a fire extinguisher available where compressed gases are stored. Have one nearby when using flammable compressed gases. Know your emergency and evacuation plan in case a fire occurs.

**ALWAYS** segregate full cylinders from empty cylinders.

**ALWAYS** ensure you have properly identified the contents of each compressed gas cylinder prior to placing it in service. Read the label, know the gas properties, and review the MSDS.

**ALWAYS** perform a check of your equipment to look for possible leaks. Immediately remove from service any equipment that's found to be leaking. Remember, even small leaks can cause big problems.

And...

**NEVER** store cylinders in areas that may exceed 125° F or where they can come in contact with objects at extreme temperatures, such as a furnace or cryogenic (extremely cold) liquid. Extreme temperatures can weaken containers or cause a gas release.

**NEVER** store cylinders where they can come in contact with corrosive materials.

**NEVER** store cylinders where they can become part of an electrical circuit. Store cylinders away from electrical switches, outlets and extension cords.



**NEVER** store cylinders where water is freestanding or may collect.

**NEVER** store cylinders containing a flammable or oxidizing gas near an ignition source, such as open flames, furnace, water heater or sparking device.

**NEVER** store a flammable liquefied compressed gas, such as propane, on its side unless designed for horizontal storage.

**NEVER** transfer gas from one cylinder to another. Gas transfer activities require special training and qualifications.



**NEVER** attempt to adapt or modify valve components on cylinders or gas apparatus. Fittings are assigned to specific gases to help prevent misuse of the gas.



**NEVER** conceal damage, contamination, arc burns, or attempted repairs to a cylinder.

**NEVER** use cylinders as a support, doorstop or a coat rack.

**NEVER** lift cylinders by the protective valve cap or by use of a magnet.

**NEVER** attempt to repair cylinders, their valves or valve components. Repairs require special training and equipment, and should only be performed by authorized service personnel.

**NEVER** move cylinders by rolling them on their side.



**NEVER** remove, alter or cover cylinder labeling or markings.

**NEVER** lubricate or use pipe dope on cylinder valves or fittings. Valves and fittings are designed to operate without lubrication. If the valve is hard to operate it needs repair and should be returned to your supplier with clear instructions as to the problem.

**NEVER** handle any part of a cylinder (including valve, valve component, or gas apparatus) with oily hands or oily gloves. Contamination of cylinder surfaces with oil, grease, or any type of hydrocarbon material is dangerous.

**NEVER** allow cylinders to be stored or transported where contamination may get in or on the surface of the cylinders.

**NEVER** attempt to breathe gas that has not had its pressure reduced to the prescribed level by an authorized regulator.



Transporting compressed gas cylinders is hazardous, and you should become familiar with their hazards before transporting them.

**NEVER** transport cylinders in confined areas in vehicles, such as the passenger compartment or trunk. Gases can cause explosive, reactive, flammable, oxidizing, oxygen deficient, extremely cold, corrosive or health-hazardous environments. Such a practice is extremely dangerous. Every year incidents occur where people disregard this warning and the results are tragic. We urge you to have the cylinders delivered in vehicles properly designed and with adequate ventilation.



Most accidents involving the handling and transportation of compressed gases are caused by not following proper safety procedures.

Because compressed gases are considered Hazardous Materials, the Department of Transportation (D.O.T.) in the United States, and Transport Canada in Canada, regulate their transportation. Transportation of compressed gases triggers many regulatory requirements, some of which are covered here:

- ◆ Documents called "Hazardous Material Manifests" or "Shipping Papers" are required for each shipment of hazardous materials. In many cases, the Delivery Order you receive for the cylinder transaction is designed to comply with these requirements.
- ◆ Compressed gas cylinders must be properly labeled before they can be transported. The labels should never be removed or defaced.
- ◆ Compressed gas cylinders must be secured from movement during transportation, otherwise they can open accidentally, or roll off the vehicle into the path of oncoming traffic.

*Note: Even cylinders that are considered empty are still hazardous materials and are, therefore, still regulated because of the small amount of residual gas they contain.*

## Remember...

Don't hesitate to ask questions. Your safety is our number one concern. Your Airgas representative will assist you as much as possible.

If an emergency occurs during the transportation of compressed gases, guidance can be obtained by calling the toll-free number that is printed on the back cover of this booklet. In addition, the following are selected pages from the Emergency Response Guidebook, also known in previous years by its older acronym, the NAERG Guide. The guides for various gases are broken down into three major categories and 8 sub categories, as follows:

**Potential Hazards**  
Health  
Fire and Explosion

**Public Safety**  
Isolation Information  
Protective Clothing  
Evacuation

**Emergency Response**  
Fire  
Spill or Leak  
First Aid

## Finally

The information in this guide is general information and should not be used as specific information for a particular gas, or in lieu of an MSDS for a specific gas product. Emergency response activities must only be undertaken by certified Hazmat Technicians, in accordance with OSHA 29 CFR §1910.120(q).



*For all Airgas  
MSDS Data Sheet information,  
just log onto:*

**[www.airgas.com](http://www.airgas.com)**

*To find the Airgas location  
nearest you, call:*

**866-924-7427**