

[www.asiaiga.org](http://www.asiaiga.org)



## SAFETY BULLETIN 41/24

### The Safe Transport, Use and Storage of Acetylene Cylinders

ASIA INDUSTRIAL GASES ASSOCIATION

No 2 Venture Drive, # 22-28 Vision Exchange, Singapore 608526

Tel: +65 67055642 Fax: +65 68633307

Internet: <http://www.asiaiga.org>

LinkedIn profile: <https://www.linkedin.com/company/asiaigaorg>

## The safe Transport, Use and Storage of Acetylene Cylinders

### Introduction:



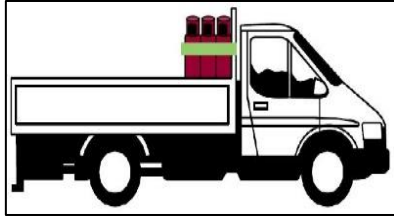
Acetylene gas is colourless. It is slightly lighter than air, highly flammable and can generate an explosive atmosphere at concentrations above 2.3% in air. Very little energy is required to ignite an air/oxygen-acetylene mixture that could result in an explosion. Ignition can arise from sources including the following:

- Matches or cigarette lighters
- Sparks from static electricity
- Internal combustion engines
- Sparks from mechanical impact
- Mobile/cell phones, two-way radios, pagers
- Non-flameproof (non-explosion proof) electrical equipment
- Friction
- Any item containing batteries including battery operated vehicle locking devices apart from quartz watches.

Even without oxygen, under certain conditions, acetylene can decompose explosively into carbon and hydrogen.

To prevent this happening acetylene is stabilized by storing in specially designed cylinders, filled with a porous material and containing a solvent (most commonly acetone) into which the acetylene is dissolved.

All gas cylinders, whatever their gas content, are potentially dangerous when exposed to fire. **Acetylene cylinders will require additional cooling once the fire has been extinguished** to fully cool the porous material, solvent and acetylene.

**Safe transport of acetylene cylinders:**

Acetylene cylinders should be transported by the supplier's vehicle. If using private transport, it is strongly recommended that an open or well ventilated vehicle is used.

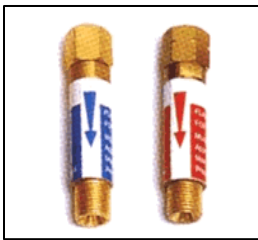
Do NOT transport acetylene cylinders in an unventilated vehicle or unventilated compartment within the vehicle, because small leaks can create explosive atmospheres.

Always close the outlet valves of individual cylinders or bundles during transport. Acetylene cylinders are never completely empty because acetylene is dissolved in the solvent and residual acetylene remains, even if there is no more flow/pressure when the valve is open.

Ensure that any valve protection (cap or guard) is in place and that regulators and other equipment are disconnected from the cylinder before transport.

Always ensure that gas cylinders are fixed and secured for transport, preferably in the vertical position and separated from the driver's compartment.

- Never smoke when transporting acetylene cylinders.
- Never park a vehicle with acetylene cylinders in an enclosed or covered area (e.g. public garage)
- When the destination is reached, remove any cylinder from the vehicle. Do not store cylinders inside any vehicle.

**Safe use of acetylene:**

Before using cylinders ensure that you have been properly trained and are competent with the equipment being used.

When moving cylinders from the cylinder storage area to the place of work, ensure that the valve is closed and fitted with a protection cap or valve guard. Use a cylinder trolley.

Before commencing work, ensure the work area is adequately ventilated, clean and that appropriate risk assessments have been conducted.

**Equipment shall be designed specifically for acetylene** (propane or oxygen equipment might not be suitable) and shall be kept in good working condition and free from oil or grease.

**It is essential to install flashback arrestors and check (non-return) valves.**

Ensure availability of appropriate fire extinguishers. It is strongly recommended that dry powder type fire extinguishers are available close to or in the work area.

Acetylene cylinders are designed to be used in the vertical position. This helps to avoid solvent spitting experienced with some types of porous material.

Flashback occurs when acetylene flow rate is lower than torch demand. Too high flow causes spitting, flame disturbance and reduces the effectiveness of flashback prevention devices.

If spitting continues the cylinder should be removed from service, marked or labelled and returned to the supplier.

Cylinders should always be secured, for example by means of retaining straps or chain, pallets or barriers, when in use.

Do NOT "crack" open the cylinder valve to blow out dust from the valve outlet as there is a risk of ignition. If necessary, clean the outlet valve with a lint free cloth before connecting the regulator.

When connected, ensure that the regulator pressure is released and face away from the outlet before slowly opening

the cylinder valve.

Ensure that the equipment is leak tested and purged of air before use.

Before use, check for gas leaks at each connection with a suitable leak detection product.

Always treat the torch with care. Never use the torch as a hammer

Follow the manufacturer's installation and operating instructions, in particular:

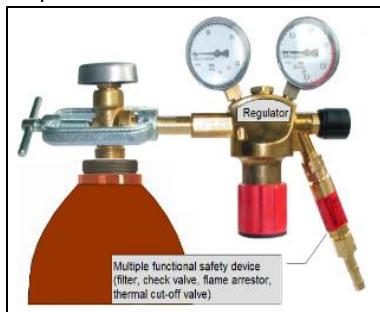
- Select the correct gas nozzle for the flow rate;
- Set the gas pressures for the nozzle size being used;
- Before lighting the torch, purge each gas hose separately for a few seconds; and
- Never bring a lighted torch near a gas cylinder.

After use always:

- Close the torch and cylinder valves, in the order recommended by the supplier;
- Release the regulator pressure; and
- Depressurize each hose by opening each torch valve individually.

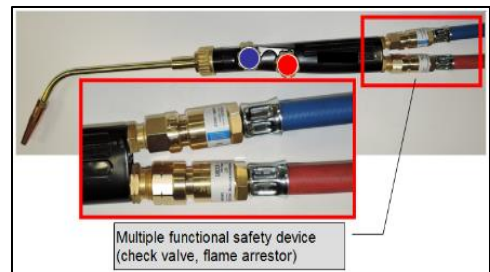
**Safety devices in oxy-acetylene welding process:**

To prevent a reverse flow and a flashback, safety devices shall be mounted on the regulator and on the torch. This rule applies for both acetylene and oxygen.



The highest level of safety is reached with the help of multifunctional safety devices.

Regulator-safety devices shall incorporate the following elements: inlet filter, check valve (non-return valve), sintered flame arrestor and thermal cut-off valve.



Torch mounted safety devices shall incorporate the following elements: check valve (non-return valve) and sintered flame arrestor.

**Safe storage of acetylene cylinders:**

When not in use, store gas cylinders in a safe well ventilated area that is secure and lockable. Never store acetylene cylinders in occupied buildings, unventilated rooms, underground rooms (cellars) or in areas accessible to the public. Store cylinders away from heat and ignition sources, flammable or corrosive materials

Cylinders should only be stored in areas where water cannot accumulate as this can cause corrosion to the cylinder base

Ensure that cylinders are secured upright.

Ensure the storage area is designated "NO SMOKING" and that there are no other ignition sources in the area, such as those detailed in the introduction to this leaflet.

Compliance with ATEX Directive shall be considered.

Rotate stock on a first in, first out basis as good practice.

**Troubleshooting:**

In the event of a problem with the cylinder, contact the supplier for expert support.

Do NOT attempt to repair acetylene cylinders or valves

Do NOT heat acetylene cylinders!

**Leaking cylinder and valve**

Close the cylinder valve.

If the leak has stopped, take cylinder out of service, identify the cylinder, inform the supplier and arrange for the cylinder to be collected.

If the cylinder is still leaking ventilate the room by opening doors and windows. Avoid ignition sources such as non-EX electrically operated fans.

If possible, and safe to do so, move the cylinder to a safe area outside and away from ignition and heat sources and public access.

Evacuate the area within the vicinity of the cylinder.

Contact the fire services and the cylinder supplier.

**Flash back in cylinder equipment system**

Immediately close both the blowpipe/nozzle valves. Close the cylinder valves on the acetylene and oxygen cylinders.

If there is no external flame present check to see if the acetylene cylinder is heating indicating an internal decomposition. If the cylinder is observed to be hot then immediately follow the advice provided in the section "Cylinders in fires".

Check the valve outlet for soot. A valve with soot in the outlet means the cylinder has to be taken out of service suitably identified and returned to the supplier.

If the cylinder is cool and there is no soot in the valve outlet, the cylinder can stay in use but the equipment must be checked to see if it was the cause of the flash-back before if it is reused.

**Cylinders exposed to nearby fires**

If safe to do so, extinguish the fire around the cylinder as quickly as possible.

KEEP AWAY, DO NOT APPROACH.

Do not attempt to move the cylinder or operate the valve.

Sound the alarm.

Evacuate the area.

Contact the fire services and the supplier.

**Fire due to hose/piping leak**

If safe to do so, close the cylinder valve to extinguish the flame as quickly as possible.

**Cylinders following severe impact (e.g. road traffic incident)**

Even if the cylinder is not leaking and does not show signs of internal heating (e.g. hot spots), as a precaution, the cylinder shall not be used until it has been inspected for damage by the cylinder supplier.

**Reference:**

- Safety Data Sheet for acetylene
- AIGA 022 "Code of Practice - Acetylene" Asia Industrial gases Association [www.asiaiga.org](http://www.asiaiga.org)
- AIGA 01 "Safe Use of Acetylene" Asia Industrial Gases Association [www.asiaiga.org](http://www.asiaiga.org)
- AIGA 037 "Permissible Charge/Filling Conditions of Acetylene Cylinders, Bundles and Battery Vehicle" Asia Industrial Gases Association [www.asiaiga.org](http://www.asiaiga.org)
- EIGA SL004 "The Safe Transport, Use and Storage of Acetylene Cylinders" European Industrial Gases Association [www.eiga.eu](http://www.eiga.eu)
- EIGA Doc 134, *Potentially Explosive Atmospheres EU Directive 1999/92/EC*, [www.eiga.eu](http://www.eiga.eu)

***Disclaimer***

All technical publications of AIGA or under the AIGA name, including codes of practice, safety procedures, and any other technical information contained in such publications are obtained from sources believed to be reliable and are based on technical information and experience currently available from AIGA and others at the date of their issuance.

Where AIGA recommends reference to or use of its publications by its members, such reference to or use of AIGA's publications by its members or third parties are purely voluntary and not binding.

Therefore, AIGA or its members make no guarantee of the results and assume no liability or responsibility in connection with the reference to or use of information or suggestions contained in AIGA's publications.

AIGA has no control whatsoever as regards performance or non-performance, misinterpretation, proper or improper use of any information or suggestions contained in AIGA's publications by any person or entity (including AIGA members) and AIGA expressly disclaims any liability in connection thereto. AIGA's publications are subject to periodic review and users are cautioned to obtain the latest edition.