



## NDMRB-SOP-001 Safe movement and handling of Compressed Gas Cylinders

### 1.0 Introduction

Compressed gas cylinders are difficult objects to move and handle safely. There are a number of risks to be considered, this document aims to provide instruction and guidance to enable users to handle and move cylinders in a safe and controlled manner. This guidance is aimed at anyone who intends to use, handle and move cylinders; however, this does not apply to Liquid Petroleum Gas (LPG) or propane/butane cylinders.

The main hazards associated with compressed gas cylinders include:

- Impact from the blast of a gas cylinder explosion or rapid release of compressed gas and debris thereof
- Impact from parts of gas cylinders regulator that fail, or any flying debris
- Contact with the release gas or fluid (e.g. Chlorine, liquid CO<sub>2</sub>, etc...)
- Fire resulting from the escape of flammable gases or fluids
- Impact from falling cylinders
- Manual handling injuries (Musculoskeletal Disorders)
- The main causes of accidents are:
  - Inadequate training and supervision
  - Poor installation
  - Poor examination and maintenance
  - Faulty equipment and/or design (e.g. badly fitted valves and regulators)
  - Poor handling (including failure to use appropriate handling equipment)
  - Poor storage
  - Inadequately ventilated working conditions
  - Incorrect operation
  - Hidden damage

### 2.0 Use of compressed gas cylinders

Before the use of any gas the relevant COSHH and MSDS should be consulted, read and understood. If the gas to be used is particularly toxic or harmful relevant risk assessments should be carried out and safety measures in place prior to its use. Always check that the gas that is going to be used is the correct gas for the intended application. Check that the cylinder looks to be in good condition and that there are no leaks. If the cylinder sounds as if it is leaking contact the DSO or relevant lab manager. Always ensure that the pipework that is to be connected is in good repair and that the regulator is suitable and intended for the gas to be used. Gas cylinders should always be

used and stored in an upright position; unless specifically designed otherwise and when cylinders are being stored or used they should be chained or strapped in this upright position or placed in a suitable cylinder holder. Where possible, secure cylinders out of laboratory traffic areas and when the gas cylinder is not in use the valve should be closed and dust caps put in place where provided. When empty a label should be applied to the cylinder.

### **3.0 Movement of compressed gas cylinders**

Before considering the movement of any cylinder consult the weight and size guide (5.0). Ensure that you are aware of the weight and size of the cylinder you intend to move. Consider the weight and height of the cylinder and do not attempt to move a cylinder if you think the load will be too large.

Personal Protective equipment must be used during the movement of compressed gas cylinders this includes: suitable gloves, eye protection, lab coat and foot ware with metatarsal protection.

#### **3.1 Moving cylinders over a short distance (2 metres or less)**

If you are moving the cylinder over a short distance (within the gas storage area) on a firm even surface then 'churning' can be employed. This method can also be used to move a cylinder onto a transport trolley. A transport trolley must be used in any movements beyond a short distance.

- Tilt the cylinder slightly away from your body, holding the cylinder at the top.
- Rotate the cylinder away from your body slowly into its new position and secure accordingly.
- This method takes some practice and should be carried out under supervision until the handler is confident and deemed competent.
- Never drop, roll or drag compressed gas cylinders.
- 3.2 Moving compressed gas cylinders over medium/long distances including from the store to the laboratory
- When moving cylinders over a distance a trolley designed solely for the movement of gas cylinders must be used.
- The cylinder should be settled into the trolley so that it sits in the cradle and then secured using a chain or strap (check that these are in a good state of repair). Cylinders should always be moved in an upright position and the valve should always be closed, this applies for empty cylinders

#### **3.2.1 Moving compressed gas cylinder using a lift**

Due to the risk of asphyxia due to a leakage in a confined space people should not travel with cylinders in lifts. Use a goods lift where practicable. This procedure requires two people:

- The first person is to stand outside the lift of the floor the cylinder is to be moved to, this will ensure that anyone else can be informed of what is occurring
- The Second person calls the lift and when it arrives place the cylinder, secured in the trolley, in the lift
- Place a sign warning people not to enter or place other goods in the lift with the canister

- The first person should be contact and they call the lift to the floor and remove the cylinder and signs from the lift.

### 3.3 Other issues to consider

If you find cylinders leaning, do not move the cylinders alone. Employ help and ensure that everyone is aware of what you are going to do. This will ensure that you avoid trapping fingers and being hit by falling cylinders.

When a cylinder is upright always ensure that is it securely fastened and not left free standing. Employ the 'churning' technique (3.1) to move cylinders against walls and into positions where they can be secured.

#### 3.3.1 Cylinders on the floor

If a cylinder is found lying on the floor you must be certain that you are able to lift it. If you feel that you cannot lift it alone seek help from a colleague.

If you feel that you can lift the cylinder employ the following guidance:

Ensure that the cylinder valve is off, using appropriate cylinder key.

If regulator is present ensure that there has been no damage, then remove if it is safe to do so.

- Position your feet hip width apart with one foot slightly in front of the other, astride the valve of the cylinder.
- To ensure that you are using your thigh muscles do most of the lifting, bend your knees to lower your body.
- Grip the cylinder neck (if a valve guard is present and is secure then you can use this to lift) using both hands.
- Keep your back straight (this does not necessarily mean vertical), pull your chin in to lock your back in a straight line and look in front rather than at the ground.
- Lift in a fluid, purposeful and non-jerking motion. Do this by initially straightening your legs and following through with your arms at the same time as working forward until the cylinder is upright.
- Ensure that the cylinder is then stored properly and securely.
- Never attempt to stop a falling cylinder – get out of its way!

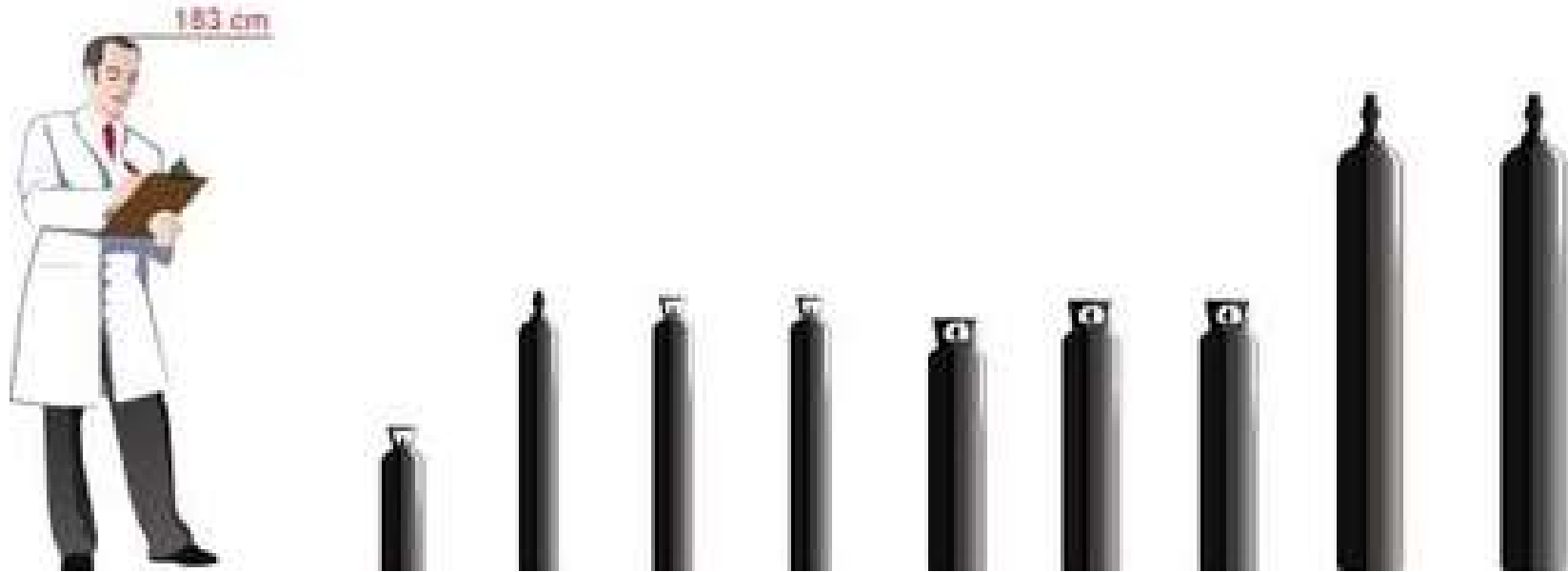
### 4.0 Fitting and Removal of regulators

On a fresh cylinder there will be a dust cover that will need to be snapped away from the access port. Ensure that the port is not pointed out into an open working area, ideally facing a wall. This will ensure that in the event of opening the valve too far that the valve screw is fired into the wall and not into any passing individuals or yourself.

Ensure that the port is clear and clean of debris. Place the regulator in position and hand screw into the port. The regulator should screw cleanly and easily into the port, tighten with a cylinder key a quarter turn. There is never a need to use Teflon tape to seal this connection as the brass fittings, when connected properly, are gas tight.

When removing a gas cylinder, close the regulator off first, then cylinder valve using a cylinder key. Vent the content of the regulator by opening the regulator valve and then close. Remove the regulator valve from the cylinder using the cylinder key.

5.0 Industrial Gas Cylinders



Size Reference	E	F	V	X	S	T	Y	K	N
Dimensions (cm)	50x15	86x14	94x14	94x14	87x20	93x20	93x20	146x23	146x23
Gr. Weight (kg)	7	18	19	19	34	34	40	75	82



Size Reference  
Dimensions (cm)  
Gr. Weight (kg)

W	L	Z
146x23	164x23	164x23
85	87	77

Diagram reference: <http://www.boconline.co.uk/en/sheq/gas-safety/cylinder-weights-sizes/cylinder-weights-size/cylinder-weights-size.html>

## 6.0 Safety, awareness and approval

- All personnel who will be using or intend to use compressed gas should read and understand this document.
- All MSDS and COSHH should be read and understood.
- All 'group gas handlers' should be familiar with section 5.0
- Training should be given firstly by demonstration following supervision.
- Once someone is deemed competent they can be assigned as a 'group gas handler'
- A list of approved gas handlers can be obtained from the TDI laboratory manager

## 7.0 Risk Assessment

The risk assessment associated with the document is NDMRB-RA-065

## 8.0 Review

The information in this document will be reviewed and amended if necessary every 3 years by the laboratory manager or alternative relevant personnel.

- *Document created April 2013 by AKK*
- *Reviewed September 2016 AKK – author initial changed from AK to AKK*
- *Reviewed August 2017 AKK – author changed the RA ref and the ref of this document to NDMRB*

## 9.0 References

- BCGA Technical Information Sheet TIS No 12:2005
- BCGA Guidance Note GN 3 – Safe Cylinder Handling and the Application of the Manual Handling Operations Regulations to Gas Cylinders, revision 1:2005
- Safe Use of Gas Cylinders, Guidance Issued by The Health and Safety executive, Issue 1, June 2004
- The Safe Use of Gas Cylinders, The Health and Safety Executive INDG308(rev1) 4/02 C250
- Frequently Asked Questions About Chromatographic Gases, , Air Products and Agilent Technologies (2003)