Glasgow City Council

EDUCATION SERVICES

Technician Support Service

Technician Guidance Sheets TGS/10b

Use & Inspection of Sulphur Dioxide Gas Cylinder & Associated Regulator

Issued by **Technician Support Service**

Date **June 2015**

Objectives:	The objective of this Guidance Sheet is to instruct Senior Support Service Technicians and Support Service Technicians (Science) in the annual inspection and safe use of sulphur dioxide gas cylinder and associated regulator
Persons responsible:	Senior and Support Service Technicians (Science)

Sulphur Dioxide Gas Cylinders & Regulators

The purpose of this Guidance Sheet is to provide information on the safe use and inspection of sulphur dioxide gas cylinders and associated regulator.

Anyone who examines, refurbishes, fills or uses a gas cylinder should be suitably trained and have the necessary skills to carry out their job safely. They should understand the risks associated with gas cylinders and their contents. (HSE Safe Use of Gas Cylinders 2004)

The following notes are guidance concerning the handling, storage, and use of gas cylinders and inspection of gas regulators to ensure that they are safe for use. The two main sets of regulations covering gas cylinders/regulators are:

The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2004
The Pressure Equipment Regulations 1999
Control of Substances Hazardous to Health Regulations 2002

The law requires that all gas cylinders, which in the case of Glasgow schools are hired or purchased via a reputable supplier, are examined and tested by the company that supplies the cylinder.

Sulphur Dioxide cylinders have a pressure of less than 6 bar and as such SO_2 regulators are not subject to the same 5 year inspection and certification that applies to 2 stage regulators as described in TGS10a.

General Inspections

Only Support Service Technicians (Science) should carry out and record SO_2 gas cylinder and regulator inspections, this includes fitting and removal of regulator control valves.

Regulators

Users should carry out and **record** an external visual examination of the gas regulator control valve **3 times per year.** This will determine whether there are obvious signs of physical damage to the casing, coupling and threads. An external visual inspection should also be carried out on **each** occasion of use.

Leak tests should be carried out on the following occasions -

- Annually
- After fitting a regulator control valve to the gas cylinder

The results of these tests **MUST** be recorded on the record sheet provided. ***Please see appendix 1***

In addition - Leak tests should be carried out if there is reason to suspect a leak and the results recorded in the additional comments section of the record sheet.

The record sheet must be retained by the school for a minimum period of five years and made available to council safety officers and officers of the HSE as requested.

Cylinders

Gas cylinders, which in the case of Glasgow schools are purchased via a reputable supplier, are examined and tested by the company that supplies the cylinder. Gas should be added to TSS Chemical Inventory within 2 days of receipt.

Users should carry out an external visual examination on **each** occasion of use of gas cylinder to determine whether there is obvious damage.

Do not use and arrange special waste uplift as soon as practicable:

- If mounting threads are damaged
- If the regulator control valve doesn't seat properly
- If the cylinder control valve requires greater force than normal to turn on or off the supply

Precautions

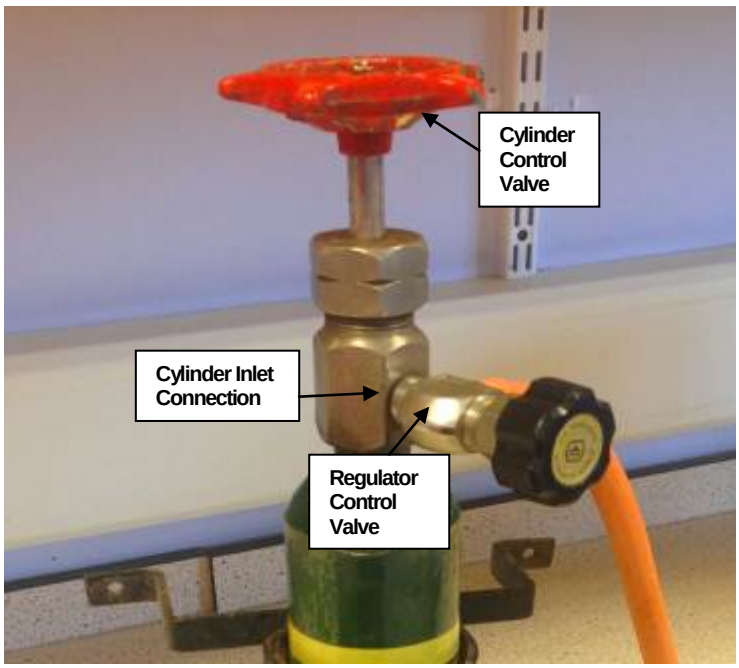
- Always double-check that the cylinder / gas is suitable for the intended use
- Do not use gas cylinders for any other purpose than the transport and storage of gas
- Do not use excessive force to open or close valves. If this appears necessary, return the cylinder to the supplier
- Sulphur dioxide cylinders should, at all times, be used in bracket provided, the cylinder should be secured to the bracket for secure storage
- **Hydrocarbon Contamination**
  Do not use oil, grease or other hydrocarbon substances on the cylinder valves for lubrication. If any cylinders do accidentally become contaminated, they should not be used but set aside and clearly labelled for special waste uplift
- SO_2 cylinders gifted to the school must **never** be used

Storage

- Entry door(s) to storage area(s) must display "Compressed Gases" safety sign. ***See Science Safety File, Appendix 4***
- Sulphur dioxide cylinders **must not** be stored beside corrosive substances: a separate area of the chemical store will suffice
- Protect gas cylinders from external heat sources that may adversely affect their mechanical integrity. Do not store next to radiators or other heat sources
- Ensure the valve is kept shut on empty cylinders to prevent contaminants entering the cylinder
- Store gas cylinders securely when they are not in use, they should be properly in the bracket designed for this purpose. This will prevent them from falling over
- Gas cylinders must be clearly marked to show their contents and the associated hazards
- Store cylinders where they are not vulnerable to hazards caused by impact e.g. under shelves

Handling

- Cylinders must be transported and securely stored in the bracket provided for this purpose
- Use gas cylinders in a vertical position, unless specifically designed to be used otherwise
- Cylinders of capacity greater than 450g must not be used in schools
- When required wear suitable safety shoes and other personal protective equipment when handling gas cylinders/regulators
- Do not use valves or regulators for lifting cylinders unless they have been designed and manufactured for this purpose
- Any cylinders involved in an incident must be withdrawn from service, set aside and clearly marked. The school should then contact TSS for further advice



Installation of Regulator

- Only ever install the regulator in an operational fume cupboard
- Remove the protective cap from the cylinder, clean with a dry, lint free cloth to remove any debris. Do not use if any debris remains and return to supplier
- Under no circumstances, should sulphur dioxide cylinders be subject to 'snifting' to remove any debris prior to fitting the regulator control valve. (Process of opening cylinder briefly to remove debris). ***See TGS10a for further information, if required***
- Remove the protective cap from the regulator control valve, clean with a dry, lint free cloth to remove any debris. Retain the protective cap for use when regulator control valve is in storage
- Check for marks or damage on the thread, this may cause a loose fit and result in gas leakage. Any damaged cylinders must be removed from service and a special waste uplift arranged as soon as practicable
- Check the regulator control valve is in the closed (no flow) position
- Using a spanner, attach the regulator control valve to the cylinder, there is no need to over tighten the regulator connection
- Carry out a leak test and record the results on the inspection record ***see appendix 1***

Producing a flow of gas

- Only ever use a sulphur dioxide cylinder in an operational fume cupboard
- Cylinder and regulator control valves should always be opened slowly
- Hammers, mallets or excessive leverage must **never** be used on a stiff or frozen valve. Contact TSS for further advice
- Open the two valves in sequence
    1. Turn the cylinder control valve clockwise, this will introduce some gas to the regulator control valve
    2. Slowly open the regulator control valve until the required flow rate is achieved, this can be achieved by bubbling the sulphur dioxide through a beaker of water ***see Fume Cupboard Monitoring Document appendix 2***

Turning off

- Close the two valves in sequence
    1. Close the regulator control valve and then close the cylinder control valve
    2. Leave the closed sulphur dioxide cylinder in a switched on fume cupboard for a further 10 minutes to ensure remnants of SO_2 are no longer present

Removal of Regulator

- Make sure both cylinder control valve and regulator control valve are closed and any excess gas has been vented in an operational fume cupboard
- Use an adjustable spanner to remove the regulator
- Clean both regulator outlet connection and cylinder inlet connection with a clean dry, lint free cloth to remove any debris and replace protective caps
- If the cylinder is empty, mark 'empty' and arrange uplift with special waste as soon as practicable

Inspection Record

The Senior Support Service Technician should maintain a record of inspections, using the record sheet provided. Any faults detected on receipt of the regulator control valve or the gas cylinder should be reported to the supplier immediately and recorded under additional comments on the record sheet.

Inspection records should be made available to Health and Safety Officers, TSS Staff and any Officer of the Council if so requested. Records of completed inspections must be retained, in a safe place, for minimum period of five years after the last entry.

APPENDIX 1

General Inspections

The gas regulator must be checked for leaks by carrying out a simple **Leak Test** on the occasion of:

- Each assembly of regulator and cylinder
- On an annual basis, the results of which should be recorded
- If there is a suspected leak

Leak Test

- Wear goggles or face visor for this test
- Leak tests on sulphur dioxide cylinders **must** be carried out in an operational fume cupboard.
- With the regulator fitted to the cylinder attach a short length of rubber tubing to the outlet and close the open end with a lab screw clip. ***See picture below***
- With a paintbrush apply a 1% Teepol solution over the joints and the outside of the regulator. Other generic detergents should never be used due to the hydrocarbon content which may result in contamination
- Adjust the output pressure to a very low flow rate
- If any leaks are indicated by the appearance of small bubbles, attempt to tighten all connections then retest
- If a leak is still evident, remove the regulator control valve and check for damage to the valve threads or cylinder seating. Contact TSS if any damage is apparent. Otherwise, re-seat the regulator control valve and re-test
- If a leak is still evident, contact TSS for further guidance
- Once leak test is complete please ensure that you remove any remaining Teepol solution with a damp cloth and dry the regulator
- Ensure all connections and valves are closed before returning to storage

References have been made to:

SSERC Bulletin 205
SSERC Bulletin 227
SSERC Hazardous Chemicals
Safe Use of Gas Cylinders HSE 2004
Safe Guards in the school laboratory 11th Edition

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Gas Cylinder Regulator Inspection TGS/10b

Gas Regulator: **Date of Purchase:**

Inspection Date	Visual Inspection Physical damage Yes/No	Regulator Leak test ✓	Comments	Signed

Gas Regulator: **Date of Purchase:**

Inspection Date	Visual Inspection Physical damage Yes/No	Regulator Leak test ✓	Comments	Signed

Gas Regulator: **Date of Purchase:**

Inspection Date	Visual Inspection Physical damage Yes/No	Regulator Leak test ✓	Comments	Signed

Additional Comments:
