

# CO<sub>2</sub> Processes

## Introduction

This presentation has been prepared in relation to a new Australian Standards introduced to improve the standards in the beverage industry, if followed this standard will help put in place procedures and systems that may help protect your staff from injury and your business from litigation if an incident occurred. In essence all measures must be taken to protect staff that deal with the operation of inert gases i.e. CO<sub>2</sub> or Nitrogen.

Gas detectors may be required if a premises is considered Non-naturally ventilated, signage will need to be reviewed, equipment inspected and possibly updated, and a training program including induction training for new employees and on going training for all staff, a maintenance program that is recorded and requires records to be retained for minimum 2 years. Your staff should sign off on the training presented to indicate that they have acknowledged the training and understand it. It is important that you ask questions if you do not understand the information provided in the Australian Standard, Supagas will provide help in any areas that are required.

You should build a file where the following information can always be located in your business so that you and your staff can refer to the information when you need it.

- Location of your site manual and safety procedures
- Emergency stops and emergency meeting areas
- The layout of your facility, exits and amenities
- A diagram of the beverage system in your business

The new standard which is now in existence has no legal standing in its own right but it acquires legal standing where adopted by government or other

authority having jurisdiction (WorkSafe) or if specified as part of a commercial contract.

The standard states that current installed equipment should be updated to conform to this standard.

Where compliance improvements are not associated with significant safety issues it is recommended that they should be implemented as follows:

- (a) Non-naturally ventilated areas, by end of 2007.
- (b) Gas operated pumps requiring exhausting to outside areas, by end of 2007.
- (c) All other areas requiring compliance improvements, by end of 2011.

If premises have a Non-naturally ventilated area then work should be considered immediately, the main issues being an assessment of the requirements for that premises as all situations will be different in general the following will be required:

- (a) Have an inspection of the area to assess the type of area and inspect the inert gas system to detect any leaks and assess for conformity to the standard.
- (b) If the area is Non-naturally ventilated then installation of an appropriate gas sensor will be required before work can continue in the area, this is mandatory.
- (c) Conduct a risk assessment.
- (d) Non-naturally ventilated – signage will have to be reviewed immediately
- (e) Non-naturally ventilated - training will have to be specific to that premises and implemented to all staff that will work in the area.
- (f) Any system will require maintenance to be reviewed and documented.

## General Background

Accidents have occurred in the dispensing of beverages due to lack of

understanding of the potential damage high pressure inert gases can cause. Gas cylinders used in the supply systems for beverage dispensing can apply high pressures and in untrained hands this can become very dangerous.

Without well designed, installed, managed and maintained pressure regulation systems and pressure relief devices, and used in accordance with safe practices, such systems could be dangerous or difficult to operate safely.

Due to all gas systems being under pressure, it is possible that the system and equipment connections may develop leaks, causing a build up of inert gases in cellars and low level areas with real possibility of asphyxia leading to collapse and death of personnel working in these areas.

There are specific references to pressure relief devices, piping, sealing material, operating temperature and design in the standard however each premises must be viewed independently.

## What is a Non-Naturally Ventilated Area

Any area which is neither outdoor nor naturally ventilated shall be considered non-naturally ventilated. Common examples of these areas are underground cellars and cool rooms. Non-naturally ventilated areas present increased hazards when pressurised gas and gas equipment are contained within them. A risk assessment shall be performed to determine their safe operation.

Unless the risk assessment indicates otherwise, these areas shall be protected by the following mechanisms:

- Gas monitoring and alarms (mandatory)
- Safe system of entry and work (mandatory)

Either of the following:

- Mechanical ventilation

- Where mechanical ventilation is not practical appropriate emergency procedures and equipment to complement the safe system of entry and work.
- Gas monitoring details see section 4.3.2 AS5034-2005

### Mechanical Ventilation

Mechanical ventilation systems could be very costly and are acceptable and will consist of suitable fans, controls, electric motors, ducting and suitably sized ventilation rates capable of providing room air changes to maintain the air supply in a room in a safe breathable state or restore it after an emergency condition.

Consideration should be given to the following:

- Control and isolation of the system from outside the non-naturally ventilated area.
- Manual activation of the system before entry to the area or on demand from gas monitoring alarms.
- Visual indication of whether the system is working or the alarm has activated.
- Need to extract and ventilate at low levels especially for carbon dioxide.
- Exhausting the gases to a safe area.
- Continuous operation of the system.
- For permanently installed systems, hard wiring of the power supply so that it cannot be turned off by unauthorised personnel.

### Training

#### Job Knowledge

All personnel handling inert gas cylinders and vessels on the premises shall be fully conversant with:

- The properties of the specific gases handled, by reference to the relevant SDS.
- Applicable safety regulations and safe handling procedures.
- Manual handling procedures for heavy cylinders.

Personnel employed in the premises shall be trained in:

- The nature of work and safe methods of operation.
- Manual handling procedures.
- The properties and hazards associated with the inert gases and gas cylinders being handled.

- The location of first aid equipment and first aid measures to be taken.
- The correct use of personnel protective equipment and its care and maintenance.
- Actions to be taken in various emergencies, including leaks and gas escape.
- Simulated emergency exercises shall comprise part of the training.

### Contractors

Contractors and staff shall be trained as appropriate to the specific tasks to be performed:

- Safety rules of the site, including restriction on movement, access and activities and the use of PPE.
- Hazards associated with the storage and use of inert gases in cylinders and vessels
- Conditions and obligations of safe work plans.
- Applicable emergency procedures.
- All relevant personnel shall be retrained whenever changes of working or safety procedures have been made.
- Personnel Protective Equipment (PPE)

### Personnel Safety Equipment (PPE)

Where inert gas cylinders are kept or handled:

- All persons in the premises shall be provided with appropriate PPE where required
- PPE shall be kept in designated well identified locations and ready for use
- All PPE shall be maintained in a fit state of repair

### Types of PPE

- Safety glasses
- Safety shoes
- Appropriate gloves
- Hearing protection

### First Aid

A first aid station shall be provided in a clean area. It shall comprise as a minimum an appropriate first aid kit and first aid instructions e.g. SDS for all inert gases being kept or handled on the premises.

### Maintenance

#### Weekly maintenance

In order to minimise losses of dispensing gas and the associated cost, reduced

effectiveness of the dispensing system, and tripping of alarms, competent personnel should leak test all potential leak points of the system at weekly intervals and either rectify any leaks or initiate a service call.

#### Six monthly maintenance

In order to maintain the correct function and safety of the installation, inspections should be carried out at intervals not exceeding six months and should include the following:

- Any changes made in the vicinity of the installation do not affect its operation or safety.
- Flexible connectors from cylinders to a supply system are in good condition, damaged connectors should be replaced immediately.
- Any filters if fitted should be checked and cleaned, replace any damaged filter.
- Check pressure regulators for leaks, damaged pressure indicators and correct operation, any faulty regulators should be removed immediately from service.
- Valves that are used in normal operation or in an emergency, remain accessible and easy to operate.
- All accessible seals and 'O' rings in keg couplers and quick disconnect fittings shall be inspected for wear and damage and replaced as necessary.
- Testing and calibration of all alarm systems and gas monitors.

#### Twelve-monthly maintenance

- Inspection of all piping at the designated operating pressure under static conditions shall be carried out at intervals not more than 12 months during the service life of the installation.
- Particular attention should be given to places where corrosion or polymer degradation has occurred. The identity marking colour or the name of the gas shall be renewed if necessary.

#### Records of maintenance

- Records of maintenance shall be retained for not less than 2 years.
- All repair work or changes shall be authorised by means of a safe work plan or a modification to plant procedure and shall be carried out by competent personnel.