

Safety and health alert

39/99 Pressurised canister explodes injuring apprentice's hand

Incident

On 5 August 1999 an apprentice attending a metropolitan TAFE college suffered severe bruising to the hand when the small pressurised aluminium canister he was holding exploded. It was fortunate that he and no one else were not more seriously injured.

The canister of approximately 1 litre capacity was being used to flush out automotive air conditioning systems before being recharged with refrigerant.

The process adopted was to fill the canister to 75% capacity with liquid solvent, seal the canister then pressurise it to a maximum pressure of 700Kpa (100 PSI) with compressed nitrogen gas from a commercial nitrogen gas cylinder. The nitrogen gas is used as a propellant to force the solvent through the air conditioning system.

It was during the pressurisation of the canister that it exploded.

Factors

1. The canister with a maximum operating pressure of 700Kpa was connected to a gas cylinder with a pressure rating of 15,000Kpa with only a standard gas cylinder manually operated pressure regulating valve controlling the cylinder discharge pressure.
2. The pressure regulating valve was not pre-set at the canister's maximum operating pressure and could be altered to any pressure at any time.
3. There was no pressure relief valve in the reduced pressure side of the system to prevent the canister from being over pressurised.
4. The 0 to 10,000KPa pressure gauge made it difficult to accurately adjust the pressure regulator to a pressure as low as 700Kpa.
5. The pressure regulating valve had been opened by an unknown amount before the gas cylinder isolating valve was opened.

Recommendations

1. The propellant used to discharge the solvent from the canister should be a product that has a boiling point suitable to generate vapour pressures at ambient temperature that will not exceed the maximum safe working pressure of the canister. Example - R134A
2. When pressurising the canister it is preferable to deliver from a source of equal or lower pressure however,
 - a. if pressurising the canister with a gas from a source that has a higher pressure than the canister, the gas must be supplied through a pressure regulating (reducing) valve, and be fitted with a pressure relief valve set no higher than the canister's maximum safe working pressure; and



- b. a pressure gauge on the reduced pressure side must have a scale capable of reading in the middle third of the gauge to provide greater accuracy in the adjustment of the pressure regulator; and
- c. the pressure regulator must be in the fully closed position when the cylinder isolating valve is opened and then slowly adjusted until the required pressure is attained.

Further Information

Further information can be obtained from the WorkSafe internet site www.worksafe.wa.gov.au, or by contacting customer service on 1300 307 877 or email: safety@docep.wa.gov.au.

Date: August 1999

