



Gas Cylinder Regulators

A school recently reported an incident in which the regulator for a hydrogen cylinder failed, resulting in the release of gas in an alarmingly noisy way. In fact, this incident is less dangerous than it sounds, especially if the possibility is anticipated, and staff know what to do.

When the cylinder key is turned on, if the valve fails hydrogen will pass through the first stage of the regulator, and then escape through a relief valve. The relief valve is there for just such an eventuality - to prevent pressure build-up inside the regulator, which could have potentially serious consequences. The rapid release of gas can produce a loud hammering noise, which may cause staff to panic. There is no real danger - simply turn off the supply using the main cylinder key. Clearly, with some hydrogen escaping, there is a risk of it catching fire, so all naked flames should be extinguished before cylinders are switched on. However, the danger is less than often thought. Even if the gas caught fire and burnt at the cylinder, it could be extinguished by turning off the cylinder key: the cylinder cannot explode as it contains no air. Also, it is often not realised how little hydrogen is present in small B-size cylinders commonly used in schools; when expanded to atmospheric pressure there is only 1.5 m³ (48 ft³). Hydrogen in the air diffuses very rapidly, and even if the entire contents of the cylinder were released into a typical school laboratory (200 m³), then the percentage of hydrogen would be well below the explosive limits (4-75%).

Failure is usually due to the polyurethane valve seating perishing over a period of time. Regulators should be serviced every five years or so¹, but realistically schools probably won't do anything until they fail. Technicians could check for the first signs of failure by testing the relief valve with soap solutions from time to time.

¹ Regulators must now be checked every 5 years.