

<b>DISCIPLINE INFORMATION NOTE</b>			
<b>Other Gases</b>			
<b>DIN No</b>	CD5/060	<b>Issue Date</b>	November 2006
<b>Open Government Status</b>	Fully Open	<b>Review Date</b>	November 2008

To: Process Safety Inspectors in HID and FOD.

### **ACETYLENE CYLINDERS IN FIRES BY MARGARET GREGSON**

1. The purpose of this note is to summarise the procedures used by the Fire Services when dealing with gas cylinders in fires and to highlight the measures recently introduced to reduce disruptions to transport systems.
2. All gas cylinders can fail catastrophically in a fire situation. This is irrespective of gas type (flammable, oxidant, inert, toxic), physical form (compressed gas, liquefied gas, dissolved in a solvent), cylinder safety devices (relief valve, fusible plug). This is because the internal pressure increases with temperature. Also, if the cylinder is subject to high temperatures, such as those produced by direct flame impingement, it can lose its strength. Therefore, cylinders involved in a fire should be cooled with water, if it can be done safely. This reduces internal pressures and much of the strength of the cylinder is restored.
3. Acetylene is a special case because it can undergo a self-sustaining internal decomposition reaction, producing its own heat, which may continue after the fire has been extinguished. Therefore, an acetylene cylinder which has been directly involved in a fire is potentially unstable and very dangerous. This presents an additional safety risk and is of particular concern to the Fire Service. (For further information, see the HSE leaflet 'Take Care with Acetylene'.)
4. In 2003, the Fire Service Inspectorate published Fire Service Manual Volume 2: Fire Service Operations, Acetylene Cylinder Incidents<sup>2</sup>. This recommends cooling acetylene cylinders affected by fire, for at least 24 hours. It also recommends identifying an initial hazard zone extending a maximum of 200 m around the affected cylinder, while the situation is assessed. If the acetylene cylinder is considered to be in a dangerous condition, it may be necessary to evacuate the hazard zone, closing road and rail access, while the acetylene cylinder is cooled and made safe. This hazard zone could be maintained in excess of 24 hours.
5. Fires involving acetylene cylinders are not uncommon as many workshops have oxy/acetylene sets. Following publication of the manual referred to above, some fire brigades, faced with such a fire, appeared to use an ultra-cautious approach, automatically setting up a 200 m hazard zone for 24 hours. Opportunities to reduce the hazard zone at an early stage, once the situation was under control and cooling was underway, were not taken. In addition, there were a number of false alarms, where zones were set up,

but on subsequent investigation, the cylinder was either not acetylene or it was unaffected by the fire.

6. Maintaining a hazard zone of up to 200 m radius for up to 24 hours is very disruptive to the areas concerned. There have been complaints particularly from transport organisations and some calls for limitations in the use of acetylene.
7. In order to increase understanding of how to manage gas cylinders involved in fires and so decrease the level of inconvenience and disruption, the British Compressed Gases Association has produced a guidance note specifically for the Fire Service. It is entitled:

BCGA Guidance Note GN15 - Managing Gas Cylinders Involved in a Fire

It can be found on the website of the Office of the Deputy Prime Minister. It gives detailed information on cylinder identification, how to assess the condition of an acetylene cylinder and when to consider reducing the hazard zone. It also provides contact numbers for the five main cylinder gas companies which have undertaken to provide 24-hour technical support. A competent person will be on call to give advice or to attend the site, if the situation demands it.

8. In addition, the Fire Service Inspectorate, with the help of BCGA, is developing a training package and video. It is hoped that these measures will eliminate unnecessary inconvenience and disruption while maintaining safety.

## References

1. Take Care with Acetylene INDG327, HSE Books.
2. Fire Service Manual Volume 2: Fire Service Operations, Acetylene Cylinder Incidents. HM Fire Service Inspectorate Publications Section.  
  
Published by TSO (The Stationery Office) ISBN 0 11 341226 6
3. BCGA Guidance Note GN15, Managing Gas Cylinders Involved in a Fire, 2004. Published by British Compressed Gases Association.