

Dissolved acetylene C_2H_2 – customer communication. Case study.

Business benefits

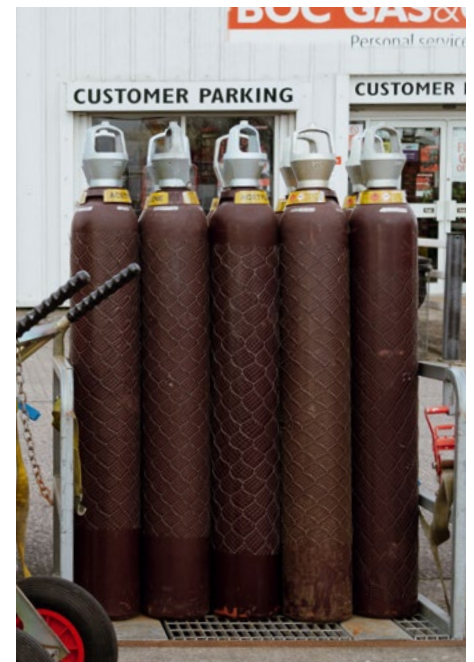
- The hottest and most efficient of all the fuel gases, increasing productivity
- Uses oxygen efficiently, reducing costs
- Lighter than air, so will not accumulate at low levels, and is safe to use underground
- Low ignition energy
- Low moisture content flame
- Non-toxic (may cause dizziness in high concentrations)

Acetylene is the most flexible oxy-fuel gas and is used across multiple welding, heating & metal cutting applications. Put simply, there is no replacement for it and when handled, stored and transported correctly, acetylene is perfectly safe and has been invaluable to industry for over one hundred and sixty years.

Background

All gas cylinders present an explosion risk if exposed to fire and the Fire and Rescue Service (FRS) are aware of this and have safe methods for dealing with gas cylinders when involved in fires.

From 2003 until 2012, and only in the UK, FRS had what has since proven to be a somewhat excessive precaution for Dissolved Acetylene (DA) cylinders, which involved water cooling them for at least 24 hours, during which a hazard zone of 200 metres radius was usually maintained throughout. This was generally due to what is known as the decomposition of acetylene due to the gases distinct properties. Whilst very safe, this often led to major disruption, which in turn, prejudiced safety away from the incident.



What did BOC do?

In 2006 BOC offered the British Compressed Gases Association (BCGA) various initiatives, which assisted in gathering together senior members of the Fire and Rescue Service, together with various government departments and agencies, to work together towards a solution, which led on to the BAM research project.

Five Stakeholder parties, namely BCGA, DFT, HSE, TFL and latterly, CFA funded major research conducted over 2008 and 2009, by BAM, the German Federal Institute for Materials Research and Testing. BAM is world renowned in acetylene science and research. Their task was to find out with certainty-after how many hours of realistic cooling can we be sure that no decomposition can be ongoing and therefore that it can be safe to close out an incident completely.

The results from The BAM work may be summarised as follows:

- Mechanical impact alone cannot initiate acetylene decomposition
- Decomposition of acetylene cannot be initiated until at least 350 °C, meaning that only a cylinder which has been exposed to direct impingement can be at any risk
- Polymerization reactions of acetylene can occur at temperatures below 300 °C, but these are pressure-reducing reactions and therefore not of concern to FRS
- BAM confirmed that the previous 24 hour cooling had been very excessive and that 1 hour cooling was more than enough in the vast majority of acetylene incidents

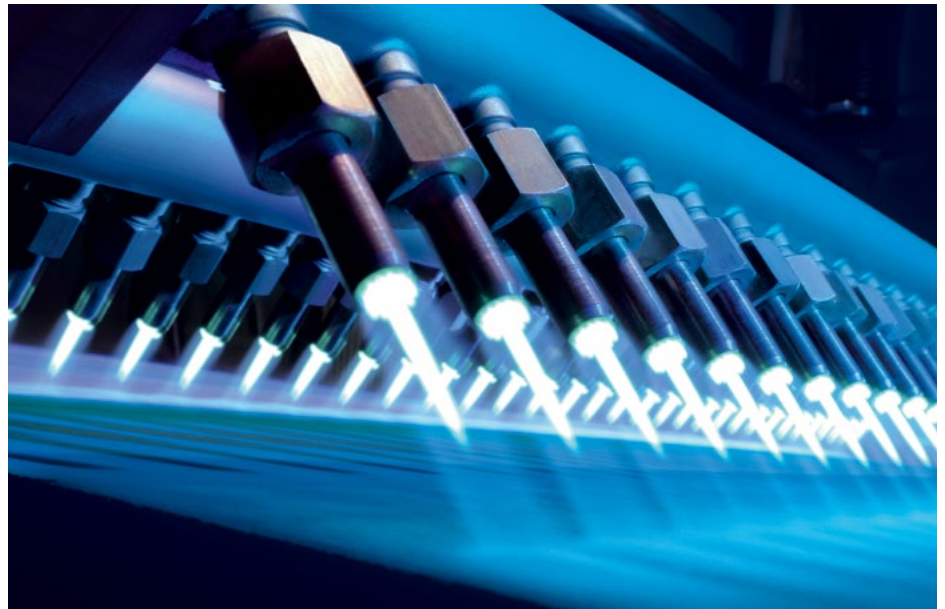
Following the BAM investigations and research, work was discussed extensively with the Fire and Rescue Service and with DCLG's expert panel of consultant professors and a recommendation was accepted that 1 hour cooling, followed by a further 1 hour monitoring precaution would be more than prudent. This agreed with the empirical evidence found at real incidents.

On the 30th November 2012 the UK Fire and Rescue Service protocol for acetylene cylinders in fires was officially changed.

For further information about cylinders in fires, please also refer to www.BCGA.co.uk

Doug Thornton,
Chief Executive, British Compressed
Gases Association

“Users of acetylene can be assured that our research now proves that acetylene should be no more disruptive than any other gas cylinders if involved in a fire. In many scenarios acetylene is even the safer option to choose.”



BOC

Customer Service Centre, Priestley Road, Worsley, Manchester M28 2UT
Tel 0800 111 333, www.BOCOnline.co.uk