

Independent & Cost-Effective Gas Safety Solutions

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Dear All,

Welcome to the Winter 2006 edition of our Client Update.

I'd like to take this opportunity to thank all of our friends and clients for their help and support during 2006 and to wish all of you a very merry Christmas and very happy New Year too.

As the old year winds to its end we have a chance to reflect on 2006 and to comment on what we have been up to during the year:

1. INSTALLATIONS & PROJECTS

2006 has been a very busy year for Bob's team but we have [somehow] managed to achieve a number of milestones. Not least amongst them:

completion of the riser cupboard regulator refurbishment and replacement project for one of this country's leading pharmaceutical companies: a large job made difficult by the number of lab's affected numerous manifold and pipeline installation projects - within time deadline and to budget (mostly including the photonics laboratories at Aston University; which had taxed and baffled all concerned at various points along the way!

and one in particular which has raised a very serious concern about the selection of safety relief valves (see below)

In short, I'd like to thank Steve, Graham, Greg, Bushy, Les & Adey for all of their hard work in all weathers and all sorts of conditions - I'm sure that 2007 will bring a raft new challenges and demands - so, enjoy the break and make sure that your batteries are re-charged.

2. TRAINING & CONSULTANCY

Over the year we have been kept pretty busy on the training front and I was delighted to be invited to run the compressed and cryogenic (laboratory) gas safety courses for some new clients (e.g. Oxford University) as well as those who we've known for many years.

We've also been busy with Hot Work Assessor training and Hot Environments Assessor training for the power generators.

Site surveys and formal reporting have thrown up some interesting topics (some of which have been discussed in previous updates); some of which that have been extremely serious and are still under investigation.

It has also been gratifying to note the number of calls and enquiries which are purely aimed at glean-ing practical advice on the safe and correct selection and installation of gas control equipment; it's good to think that we've been able to help.

3. GAS CONTROL & ANCILLIARY SAFETY EQUIPMENT - SALES & SERVICE

Overall, 2006 has been a very good year and has produced some intriguing enquiries too.

John's analysis on this section of Gas Safety UK's range of services has highlighted the following points:

1. The maintenance of unit prices on key components (e.g. pressure regulators) in spite of steeply rising raw materials surcharges especially on copper and, hence, brass. We have even seen some components that are manufactured from stainless steel becoming cheaper than their brass counterparts - a situation that 5 years ago would have been unimaginable. This has been exacerbated by massive increases in energy costs. At the time of writing, we remain committed to absorbing these increased costs and improving our overall level of service and customer satisfaction.

2. The range of products on offer has grown during 2006 and BJ Industries have continued to support the levels of stock that are required to expedite order turn around (i.e. ex-stock for next day delivery). There have been some issues on delay but these have been consistent with imports (especially from the U.S. and Germany).

3. We have [finally] introduced credit card payment processing: for many customers this will be a big help and it has also helped many new customers to place their first orders without the delays associated with pro-forma invoicing.

4. 2006 has shown good growth and the expectations for 2007 are high.

4. THE SELECTION OF SAFETY RELIEF VALVES

During the completion phase of recent project, we were staggered to discover an apparent problem with the safety relief valves that had been supplied to us by a well-known and well-respected manufacturer. As a rule of thumb, the certified discharge capacity of a pressure relief valve (PRv/v) should be higher than the anticipated [failure] flow-rate from the regulator. Not surprisingly, if the PRv/v cannot match or exceed the regulator's discharge rate in failure mode then an unacceptable increase in the pipeline pressure could result. Depending upon the magnitude of such an overpressurisation, the result could be very serious.

So, if we consider a good or typical example:

A nitrogen cylinder manifold supplies gas to a pipeline from cylinders at 300 barg to a regulated pipeline pressure of 10 barg.

In failure mode, the manifold regulators could pass nitrogen gas at a maximum of 12 barg via an orifice of 4.7mm diameter. This would result in a discharge of ~69 kg/hr of nitrogen.

The safety relief valve selected is a right-angle type, full flow design with a nominal bore of 10mm and has been set to lift at 11.2 barg (approx. 10% above the the nominal working pressure of the pipeline). This PRv/v has a certified capacity of 611kg/hr nitrogen and would, therefore, be capable of discharging the cylinder contents [to atmosphere] without there being any unacceptable increase in pressure in the system downstream of the PRv/v.

In the recent bad and atypical example:

It was noted that the pressure reduction packages were supplied with certification to the effect that the units were CE compliant and also complied with PED (Pressure Equipment Directive).

The pressure reduction packages were manufactured in the EU were supplied complete with safety relief valves.

During the procedure for determining the failure flow rate from the regulators and then assessing the capacities of the safety relief valves (usually referred to as 'relief stream verification'), it was noted that the certified discharge capacities of the PRv/v's were actually less than 50% of what was required in failure mode! Consequently, the situation was wholly unacceptable...

Our first and most obvious recourse was to the manufacturer/supplier of the pressure reduction packages, as we assumed that a mistake had been made on their part; given the certification supplied by them.

Eventually, it became apparent that the manufacturer/supplier's attitude was that they weren't interested in helping or supplying a solution to this problem. At the time various phrases sprang to mind (many which were Anglo Saxon) one of which was latin: **caveat emptor!**

As we were the 'buyer' in this case it was, after much dispute, left to us to sort this out at our own expense; and two possible solutions were considered:

(a) To install an additional pressure regulator that would be capable of withstanding the cylinder contents pressure - this would be located downstream of the primary pressure regulator and be sized to restrict the failure flow-rate to the under-sized PRv/v's supplied by our friends in Europe or:

(b) To double-up on the PRv/v's and to use (UK manufactured safety relief valves) with a certified discharge capacity that would be significantly higher than the discharge capacity of the regulator should it fail.

In the end, we opted to go for solution (b). The project is now complete, tested and signed off by the client's process engineers.

This experience has raised some serious questions and doubts. Whilst we have reviewed our policy on purchasing and, more importantly, reviewed our other installations and we can be confident that:

(a) We won't be using the same manufacturer again unless we do the relief stream verification and we select the the appropriate safety relief valves!

(b) That we don't have other systems that have been installed elsewhere where the same mistake has been made - we know this because the pressure reduction packages used for this project were being used [by us] for the first time.

So, what, if any, is the moral of this story?

Given that:

We know that safety relief valves are NOT an option: the Code lists them as 'essential'. We know that they SHALL be suitably sized and discharge to a safe place. We also know that in some cases (e.g. hydrogen) bursting discs are unacceptable or are not recommended. We also know that regulator failure is highly unusual but that if it did occur and safety relief v/v was undersized or poorly maintained (e.g. stuck) then the consequence could be very serious...

Then, the simple moral of the story of the story must be: check! Find out from the installer what the failure flow rate will be and what what the certified discharge capacity of the safety relief valve is. We all take things on trust sometimes but trust has, it seems, to be earned.

As always, if you have any questions on this topic or if you need additional advice then please feel free to get in touch. It is also worth remembering that:

- 1. Pressure relief valves shall be CE marked and should also be marked with the set pressure.**
- 2. They shall be tested and certified by the manufacturer to lift and re-seat within tolerance and show repeatability.**
- 3. They should be tested (shall as part of a WSE) annually and re-certified.**
- 4. They should be replaced periodically (e.g. every 5 or 6 years) with new or fully refurbished units which are also tested and certified.**



PIPELINE
VENT LINE
PRESSURE RELIEF VALVE
REGULATOR

2 X 1 AUTOCHANGE MANIFOLD (CARBON DIOXIDE) SHOWING THE POSITIONS OF THE ITEMS REFERRED TO IN THE TEXT ABOVE.

If you have any questions about the issues covered in this Update then please feel to get in touch with us at the address below.



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