

The story of a standard

There are standards on performance; there are standards on safety. This is the story of the making of a safety standard for electrical apparatus for school laboratories. (The story is told from a personal perspective.) It covers most things electrical - ovens, fridges, heating mantles, centrifuges, power supplies, oscilloscopes and multimeters - and all manner of hazards - heat, fire, explosion, noise, radiation, cuts and bruises, scalding and electrocution. Exceptions are IT equipment and plugtop devices. Furthermore, the standard relates to the special needs of infants aged 3 and above, children in primary and secondary schools, and young persons aged up to 18 in educational laboratories.

The standard differs from a toy standard in that it presumes that usage is confined to school premises where children are shown what to do and supervised thereafter. That is not the case with toys, which are supposed to be safe even when children are left to their own devices.

The UK standards' body is the British Standards Institute, or BSI as it is mainly called. Most of the standards supported by the BSI are international, the two biggest providers being the International Standards Organization (ISO) and the International Electrotechnical Commission (IEC).

Thirty years ago there was no appropriate standard for lab electrical equipment. Many of the manufacturers had their own in-house ones. No two were alike. When equipment was sent to SSERC, one often had to make a judgement of Solomon in deciding whether to pass or fail.

We resorted to trying to apply one or other of the nearest standards to lab equipment. Sometimes the one on household articles, other times the one on audio equipment, and yet other times the one on IT machines. But with differences of detail between them, and little heed for usage by children, there were many fallings out, and times when a dispute was resolved without having access to the best available advice on which to base a proper rational judgement!



Then along came IEC61010. That was in 1993. I remember with excitement reading the title, 'Safety requirement for electrical equipment for measurement, control, and laboratory use'. Spot on! "That's exactly what we need!" I thought. And indeed it turned out to be immensely helpful. We immediately applied it when testing apparatus. If we found fault, we would write to the manufacturer telling him that his equipment did not comply with clause so-and-so of IEC61010.

They got the message. In 1995 the British Educational Equipment Association convened a meeting of makers and suppliers of lab equipment to agree to design and make to this standard.

Roll on another seven years, by which time the disagreements between SSERC and the equipment manufacturers had subsided because we had a good standard to work with. And then along came a difficulty which took much wrangling to resolve. We were testing a power supply whose low-voltage output was separated from the mains supply in the usual fashion with an isolating transformer. We had no problem with that. The difficulty was with the control circuit that disconnected the mains supply. It was a strangely complex circuit with opto-isolation between hazardous live and the controller. On the controller's printed circuit board running midway between the pins on either side of this opto-isolator was a copper track bearing the phase-neutral conductor from the mains supply to the circuit. Wow! Common sense told me that this

was dodgy. But it took a very, very thorough search of 61010 to find the clause that supported my judgement. The manufacturers disagreed. They engaged a firm of specialist engineers to advise them and the engineers reckoned that the system complied with the standard. I found fault with the engineers' report. They stood by it. I took the matter to the HSE, who backed me. Our dispute now stood on differences of interpretation of a single sentence in the standard. I took the dispute to the secretary of the BSI committee that looks after 61010 and had much correspondence both on what the clause actually meant, and what it was supposed to mean. At this point the manufacturers gracefully agreed to redesign their power supply, without admitting that the original design was at fault. I was grateful that's how it ended.

But that dispute was an impetus for BSI to decide to widen the scope of 61010 from laboratory electrical equipment used by adults to use by children in schools. In 2007, SSERC, together with the ASE and CLEAPSS, helped BSI draft some additional clauses to achieve this aim.

The next step was to persuade the IEC to do likewise. They agreed and the UK committee was given the task of drafting the expanded standard. SSERC played a large part in that work. The UK draft has now been through all of the international stages of consultation, being improved upon step by step. It has been voted upon positively by every full member country of the IEC and is proceeding to become an international standard. This is a satisfactory achievement for SSERC to record. ◀

Health & Safety

Hazardous chemicals updates

Now the new website (www.sserc.org.uk) is up and running, the long process has begun of updating the hazardous chemicals section to bring it in line with GHS. So far:

- 1) We have changed the tables that used to contain the Risk and Safety Phrases so that they now contain the GHS Hazard statements and the new symbols for each substance.
- 2) We have replaced the concentration effects tables. Given the number of different categories in the GHS system, the tables would have become unwieldy so we have decided on a different, more visual approach. E.g. methanal (see diagram):
 - Any solution below 0.33 mol dm^{-3} needs no label.
 - Above that, up until 1.67 mol dm^{-3} , it has the warning and the health hazard symbol.
 - At 1.17 mol dm^{-3} , it becomes an Acute Toxin by inhalation (Category 4) but this has no effect on the labelling. Cat 4 required the warning symbol but that is already there.
 - Above 1.67 mol dm^{-3} , various new categories appear but there is no change in the labelling until 9.3 mol dm^{-3} when the solution becomes an Acute Toxin by inhalation (Category 3). This requires the skull and crossbones.
 - At the same time the warning symbol is removed as it cannot appear along with a higher level symbol in the same hazard class.

- 3) The Safety phrases that were listed in the tables have been removed but have not been replaced with the GHS Precautionary Statements. In some cases there are 30 or more and it would simply become unwieldy. All the safety information itself is given in the body of the article so a simple list of the P Statements would seem superfluous.

We have started going through all the articles making sure that there is no conflict between our advice and that given in the P statements. There seems to be nothing significant that needs to be changed at the moment just a few changes in terminology. If there are entries that merit a significant change we will flag them up so that you are made aware the entry has been changed. ▶

