# The VA Winter of Discontent

Reflecting the awful winter weather that the UK has been experiencing recently, manufacturers of loudspeakers aimed at voice alarm (VA) have been experiencing a winter of discontent. And, like the weather, it stems from Europe. TF looks at how the new European standard is affecting the industry . . .

**The cause is a new raft of European standards drafted under the 'EN 54' banner, which cover pretty much all aspects of fire detection and alarm systems. The particular cold front in question is EN 54 Part 24 - 'Fire detection and fire alarm systems. Components of voice alarm systems. Loudspeakers (2008)'. Early indications suggest it is making conditions difficult, and reducing visibility to well below helpful levels . . .**

## 5839 and all that

The UK voice alarm industry has for some time worked to BS 5839 and its parts, the relevant one in this case being Part 8 - 'Fire detection and fire alarm systems for buildings. Code of practice for the design, installation, commissioning and maintenance of voice alarm systems'.

This in itself does not give any specific guidance on loudspeakers as it is (primarily) a design and installation Code of Practice, not a product standard. However, it does go so far as to say (in words of a few more syllables, obviously) "use ceramic terminals and a back box on your speakers and it'll be fine". (While on that note, an old hobby-horse is that a speaker cannot be BS 5839-8 compliant as some manufacturers still try and claim: how can a product comply with a Code of Practice for design and installation? A product may well be suitable for use in a system that complies with 5839-8 but it cannot comply with it.)

The need for loudspeakers in a voice evacuation system is rather crucial. However, speakers have one Achilles heel, which is that the main component, the speaker driver itself, is almost always a flammable piece of cardboard or thin plastic.

It is widely accepted that the loudspeaker is a weak point and the main objective of BS 5839-8 in this respect is to ensure that the speaker line integrity is maintained, so that others not in the vicinity of the fire keep working, and also to ensure the speaker (particularly ceiling units) don't assist in the transfer of fire. (It's quite likely that if the speaker has caught fire, then hope is lost for any remaining occupants in that area).

Maintaining speaker line integrity relies generally on the fitting of flameproof speaker terminals, either on the speaker or locally to it, often with a thermal fuse fitted in circuit to ensure the speaker is disconnected when the ambient temperature gets too hot. The use of fire-proof cable, such as the older mineral insulated copper covered (MICC) or the more common FP200 and equivalents, prevent the cable from failing when supported using flameproof fixings such as metal 'P' clips or steel cable ties. As the joints in the cable use ceramic or similar connection blocks, the overall result is a completely fire-proof circuit.

The second aim concerns the transfer of fire between areas. In modern buildings great efforts are made to ensure that rooms and areas are completely sealed in the event of a fire. Aside from obvious measures such as self-closing fire-rated doors, a peek above the ceiling tiles will reveal great quantities of fire-stop sealant and intumescent barriers surrounding cable ducts, tray and pipe work as they pass through walls to other areas. Such measures are very effective at slowing the progress of fire.

If a fire burns through a loudspeaker driver, it will then start eating through the ceiling void left by the hole it has created - unless the speaker has a rear back box (or 'bean-can' as they are sometimes called) to ensure that nothing can come down from above, or up from below. Many manufacturers of open chassis ceiling speakers have optional retrofitting cans specifically for this purpose.

## The EN 54-24 snowstorm

The landscape concerning speakers for PA/VA use has suddenly and dramatically changed with the introduction of EN 54 Part 24 (2008). While it actually comes into force on 1 April 2011, it is already proving a headache for manufacturers as they try to get their products tested to meet its requirements.

Essentially, EN 54-24 covers the requirements, test methods and performance criteria for loudspeakers, although industry rumblings have been quick to point out its failings. According to the BSI introduction on the standard "The primary reason for using a voice alarm system instead of the coded warnings given by sounders is to reduce the time taken for those at risk to recognise that an emergency exists, and to give clear instructions on what to do next. This means that voice alarm loudspeakers need to achieve a minimum acoustical performance, as well as constructional and environmental requirements, to be suitable for use in fire detection and fire alarm systems".

Which is fine, up to a point. The acoustical performance of a loudspeaker will largely depend on the acoustic environment it's installed in, so the minimal acoustic performance can only be a very basic measure (it doesn't even include distortion): some say it's just enough to allow reasonable comparisons to be made between manufacturers on specific products. Secondly, the constructional aspects have already long been dealt with, as noted previously, and the environmental requirements are as much to do with shipping and storage than actual use. We could end up with a speaker that will turn up

to site in good order, but still only perform as well as the acoustician has designed it to (or not, as the case may be!).

Interestingly, while it gives common requirements for the construction and robustness of voice alarm loudspeakers, as well as their performance under climatic and mechanical conditions such as humidity and exposure to sulphur dioxide, it only covers passive units and not powered ones. So the likes of Duran Audio, whose Intellivox array is very common in PA/VA applications, cannot get the product certified, as it obviously won't conform. However, there is an exclusion in the scope of the standard that neatly circumnavigates this and, according to our insider on the standards panel, it is specifically aimed at this type of speaker that is used a lot in these applications. Funny that.

In short, it says 'This European Standard does not cover loudspeakers for special applications, for example loudspeaker for use in hazardous applications, if such applications require additional or other requirements or tests than those given in this European Standard. This European Standard is not intended to cover addressable loudspeakers, loudspeakers with active components.'

So, it is perfectly reasonable for a designer to specify an Intellivox array or a stadium bowl speaker - subject to the usual risk assessments - in an installation whose products otherwise comply with EN 54. That's not to say that manufacturers should be lackadaisical in getting their products approved, but would it be reasonable to expect ElectroVoice to get its line array type-tested if a consultant decided that such a product would best cover the public at a particular open-air race track? It would take a lot of bean cans and some elaborate rigging to do it otherwise.

Which brings us to the final (and to be honest, biggest) headache for manufacturers - type testing.

Everyone by now is now pretty familiar with the 'CE' mark found on equipment (but if you're not, read the January issue of L&SI). This mark means that a product complies with the relevant EU Directive, whether it be the low voltage, electromagnetic compatibility or, as in this case, the Construction Products Directive. Achieving this compliance is done by complying with EN standards listed in the Official Journal of which EN 54 is one. Because a product must be CE marked in order to be sold in the EU, it will thus have to comply with EN 54. Many standards allow the manufacturer to self-certify, but as you probably can guess, not this one.

The European Commission describes what Attestation of conformity is suitable, and in this case it requires third party testing, as detailed below:

*Directive 89/106/CE, Annex III(2)(i), without audit-testing of samples (System 1)*

*Method(s) For the Notified Body*
*1. Continuous surveillance, assessment and approval of factory production control*
*2. Initial inspection of factory and of factory production control*
*3. Initial type-testing of the product (ITT) by a notified body*
*Method(s) For the manufacturer*
*1. Factory production control (FPC)*
*2. Testing of samples taken at the factory in accordance with a prescribed test plan*

As such it is going to take a great deal of time and money to implement at the manufacturing end. There is a real danger the costs will drive out of the market the smaller cottage or family-run businesses (let alone those trying to get into the market) as they would have to shell out sums in the region of £15k per product, not to mention the additional costs associated with the increased burden on the factory. Some manufacturers, however, have bitten the bullet: Penton, for example, is submitting 32 of its range to one of only four accredited test houses (BRE Global, Intertek and BSI in the UK and VDS in Germany).

Beware, though, of companies that use unaccredited (at least for the acoustic requirements of EN 54-24) testing establishments - the Declaration of Conformity that comes with the product will detail who carried out the third party testing, and a quick check at www.ukas.org.uk will verify whether they're bona-fide in the UK.

The testing, however, is not without its problems, as parts of the standard are unclear to both Penton and the test house. This includes the type of plastic that should be used, as it depends on the voltage or power of the device. 100V line systems are, of course, not constant voltage, unlike a fire alarm sounder, and thus it is unclear as to whether V02 or V05 plastic should be used - and there is a big cost difference between the two. Penton believes the Standard lacks a clear understanding of audio, as the content is more geared towards sounders.

But the upshot is that it will, theoretically, drive the cowboys out of the market - albeit at greater cost to the industry in general. I say that advisedly, as cheap eastern imports with false declarations are common in most other areas of the electronics industry, with precious little being done to police them, so it's likely this area will be no different.

Plenty of industry people believe that it is questionable whether the introduction of the standard will improve products; another salient observation is that only those who can afford to perform the tests will do so, thus limiting market choice for the user. But then, according to BSI 'Effective standardisation promotes forceful competition and enhances profitability' and 'Introducing standards can help businesses to retain existing clients and generate sales from new customers, while easing the process of regulatory conformity through removal of trade barriers and maximising revenue via optimised market access'.

It seems they are right about the forceful competition, but 'removal of trade barriers'? Isn't cost one of those?

## EN 54-16

This issue is not limited to speaker manufacturers. EN 54 part 16 covers voice alarm control and indicating equipment (VACIE) which brings into line all amplifiers, processors and similar hardware; Part 4 covers the power supplies for such. The same conditions apply and it is proving onerous here too.

However, the likes of TOA and Bosch are already there - Bosch has already released products under its Praesideo brand that comply with Part 16 and TOA already has its power supply equipment tested to Part 4, with other equipment such as the VM-3240 tested to Part 16 as well.

UK manufacturer Baldwin Boxall is also on the road to EN utopia via the test house with full certification expected in the summer. One of the more worrying aspects is that certification is really for systems, not individual items of kit so being able to mix and match a Soundweb with a QSC amplifier or a Peavey Nion with an HP network switch will not be as easy as it has been up to now.