Paper on Solvent Emissions Directive (SED) and how it affects Conformal Coatings

Most people will have heard about new regulations coming into force relating to controlling the use of organic solvents. These are officially termed the Solvent Emissions Directive (SED), but are sometimes colloquially termed the VOC (volatile organic compound) regulations. The full force of the regulations comes in by October 2007, but the regulations are being phased in gradually – some parts apply already. The object of the regulations is to reduce the emission of solvents into the atmosphere, thus reducing the hazards to the environment and human health.

A VOC is defined officially in terms of the vapour pressure, but as a rough rule of thumb, any solvent or other organic compound with a boiling point of less than 250ºC is classified as a VOC in Europe. There are no exceptions in Europe, but in NAFTA (USA, Canada and Mexico) there are several exemptions for solvents that are deemed less active in the atmosphere – this is one example where the USA is more industry friendly than Europe. The USA exemptions include acetone, methylene chloride and several HFCs – all these are caught by the VOC regulations in Europe, however.

One most important feature of the Solvent Emissions Regulations is that they only apply to certain defined operations. The ones of most concern to suppliers to, or manufacturers in, the electronics industry are:-

1) Manufacture of coatings
2) Other coating activities (vehicle coating, coil coating, winding wire coating and wood coating are all defined in different and separate sections) which would appear to cover PCB conformal coating.
3) Surface cleaning using more hazardous solvents. These solvents include carcinogenic or mutagenic solvents carrying the R45, R46, R49, R60 or R61 risk phrases and halogenated VOCs carrying the R40 phrase.
4) Other surface cleaning (with less hazardous solvents).

MANUFACTURE of cleaning products is NOT covered. Surface cleaning applies to cleaning of products NOT cleaning of production equipment (or floors!). Winding wire coating is also covered in a separate section.

To be subject to SED regulations the amount of solvent involved has to be ABOVE the threshold value. Where conformal coating is concerned, it will be less likely that the threshold value will be exceeded if high solids materials (low solvent content) are being used. This implies that dip coating may be preferred over spray coating, where both methods are possible. As far as cleaning is concerned the threshold limit is less likely to be reached if water based cleaners with a low solvent content are being used. Indeed certain exemptions from the regulations are given when using water based cleaners that contain less than 30% VOC material.

For manufacture of coatings the threshold value is 100 tonnes a year. Suppliers using below this amount of solvent fall outside the scope the regulations.

For other coating activities (PCB conformal coating), the threshold limit value for solvent quantity is 5 tonnes per year. For cleaning with the more hazardous solvents the threshold is 1 tonne per year – there is also a requirement to switch to less hazardous solvents as quickly as possible (plans to make this switch should have been drawn up by March 2003). For other surface cleaning the threshold is 2 tonnes a year. Manufacturers whose consumption of solvent falls below these thresholds fall outside the scope of SED.

Operations above the threshold need to obtain permits from the local authority. All new operations (those installed after 2002) must now conform to SED requirements. There are two ways to ensure compliance of existing installations with SED regulations and obtain a permit. These are either to conform to specific limits for emissions (defined in SED) or by using a solvent reduction approach. A solvent management plan must also be produced. All existing activities must comply with the requirements by 31st. October 2007. Permits for existing operations need to be applied for by 31st October 2005, if going for a solvent reduction scheme – otherwise the application date is 31st. October 2006.

The regulations do not imply that solvent based conformal coatings will be "banned" or that all coating after October 2007 must be carried out with VOC free materials. If the solvent based conformal coating that you currently use offers all the characteristics that you need for your process, and your solvent usage is over the threshold limit, then the best option is to consider solvent reclamation equipment and techniques, not to replace your tested and approved coating. Investment in new equipment may well be a more cost effective solution than re-specifying all your materials, particularly if you operate in the Automotive, Aerospace and military arenas.

This is all based on information available concerning the application of the regulations within the UK.

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