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News of Products

A preview of trends and developments

Watch out for PCB's

The toxicity of PCB's was highlighted in the fall of 1968 at Yusho, Japan, when it leaked from a crack in a heat exchanger into rice oil. The toxic insulating oil made many people who ate the mixture sick, and recently led the Japanese to ban the import of all electrical and electronic equipment having components containing PCB type oil. The French and Swedish governments are also considering a ban. And, the Council of the Organization for Economic Cooperation and Development (United Nations) has asked member countries not to use PCB's for industrial or commercial purposes.



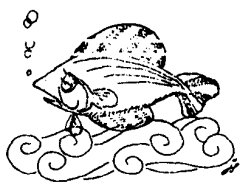
They request that PCB's be carefully controlled when used as dielectric fluids in small capacitors, in transformers or in large power factor correction capacitors, as heat transfer fluids and as hydraulic fluids.

In the United States, the EPA has issued an Advance Notice of Proposed Rulemaking for Toxic Pollutants Standards (307(a) ANPR Working Draft). The objective is to set allowable levels of PCB's and other toxic effluents in the environment. Environmentalists contend that the ANPR's proposals are not tight enough, but electronic component manufacturers say the standards are virtually impossible to meet. They gloomily forecast huge layoffs, spiralling component costs and major equipment redesigns. The problems as the manufacturer sees it, is that no other insulating oil is available with both the fire retardant capability and the dielectric characteristics of PCB's.

Specifically, the EPA's proposed rules govern discharge of PCB's and other effluents into water, and establish toxicity levels for aquatic animals (Acute toxicity is 280 micrograms per liter in lakes and streams and 100 µg/l in estuaries and coastal waters; chronic toxicity is 0.01 µg/l in all waters). Detectable levels of PCB in fish have been found world-wide, even where there is no known source of PCB discharge. The EPA has yet to set toxic levels for humans. With the exception of the "Yusho incident," no serious accidents have been reported. Therefore, according to the Federal Drug Administration's Dr. Samuel Shibko, "lack of data makes it extremely difficult to determine how much PCB is harmful (to humans). At Yusho, about 325 Japanese who ate contaminated rice were tested. The average amount of PCB ingested was 2 grams, but just 500 milligrams of PCB made the most sensitive person seriously ill.

Electronic components manufacturers argue that the proposed regulations are tantamount to a ban. Moreover, they say that medical records over a nearly 40 year period show the only adverse health effects experienced by U.S. workers exposed to askerels (a broad class of non-flammable synthetically chlorinated hydrocarbons, of which PCB is one) have been limited to occasional cases of nonchronic chloracne or other temporary skin lesions or irritations.

While admitting there is a risk to continued use of PCB's, component manufacturers argue that these risks are small, while the benefits derived from using PCB's are many. For example, some say a small industrial motor starter capacitor that uses



Arcoclor 1016 (a PCB sold by Monsanto) is about half the size of one that uses non-PCB insulating oil. Non-PCB power-factor correcting capacitors are 2.5 to 3 times larger than similar PCB types.

The fire retardant capability of PCB is well known but, if a utility is forced to use an alternative insulating oil, some power transformers would have to be housed in special vaults with special fire protection systems, or set outside where the likelihood of damage from fire is nil.

The objectors

Objections to the proposed rules have come from the chemical, transportation, and the electronic and electrical industries. A spokesman for Monsanto, which makes PCB's but sells only to capacitor and transformer manufacturers, says the proposals are "unrealistically restrictive, not supported by currently available data and not warranted under the present conditions of manufacture and use."

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In a letter to Dr. C. Hugh Thompson, chairman of Hazardous and Toxic Substance Regulation Task Force (EPA), N. Ray Clark, vice president Capacitor Division of Universal Manufacturing, called attention to the fact that more than 50 million capacitors are used in fluorescent lamp ballasts each year. He said the nonflammability of the PCB material is a major safety factor. Alternative materials have low flash/fire points. Amtrak, Penn Central, Southeastern Pennsylvania Transportation Authority and the Connecticut Department of Transportation also objected, feeling the possible fire hazard was the overwhelming consideration.

George B. Farnsworth, vice president and general manager of General Electric's Electronic Component's Business Division, in testimony before the Administrator (EPA), detailed what he felt the social and economic impacts would be, should the ANPR become law. "Forced conversion to a non-PCB oil," he said, "would result in capacitor shortages and major production cutbacks in the lighting, air conditioning and power supply industries, and their customer operation."

Protecting the public

The EPA says its purpose is to protect the public, not to put companies out of business. They say companies that have been discharging toxic pollutants into environmental waters must clean up plants and cease polluting. While there has been much outcry about the proposed standards, it is interesting to note that several small capacitor companies believe they meet EPA standards. They feel the problem is that some of the big manufacturers don't. (The most verbal critics of the EPA's proposed regulations have been the big component manufacturers.) When asked how they meet the standards, these small companies say they follow the American National Standard (ANSI) guidelines for handling and disposal of capacitor and transformer-grade askerels containing polychlorinated biphenyls.

So some companies can, and some companies can't or won't meet the proposed standards. But, perhaps realizing that a control on PCB use will eventually be put into effect, the EIA (Electronics Industries Association) has developed a new standard for capacitors using non-PCB impregnated paper dielectrics as a supplement to RS-392. The new supplement, RS-392-1, "Fixed Paper Dielectric Capacitors with non-PCB Impregnant for Alternating Current Applications," describes ac capacitor requirements where the use of materials containing polychlorinated biphenyl is restricted or prohibited.

Currently, about 10% of all power capacitors manufactured are non-PCB, with about 2% of these components going into equipment scheduled for export.

Other PCB users

In addition to capacitor and transformer manufacturing or repairing facilities, steel, aluminum, brass, bronze and copper investment foundries, waxes for investment casting processes and railroad repair facilities constitute point sources that discharge PCB's into navigable waters; so do mining operations where PCB's are used as hydraulic fluid. Monsanto sells PCB only to capacitor transformer manufacturers, but an EPA spokesman said some of the more toxic PCB homologs do find their way into the country from Europe. (PCB's made in Europe are considered 20 times more toxic than those made in the U.S.) "Furthermore," the EPA spokesman added, "even if the proposed rules were adopted today, it would do little good. We don't have an acceptable detection and monitoring technique yet."

IEEE standards for interfacing test gear

Equipment from various manufacturers can now be combined into one integral test and measurement system using the recently announced IEEE interface standard. The standard applies to the interfacing of up to 15 pieces of digital equipment on one continuous bus. Limitations include a total transmission length of 20 meters, and a 1 megabit per second data rate. The interfacing is byte serial, bit

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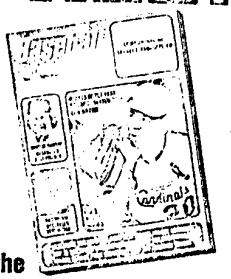

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