

million for 15 minutes. (In a typical fire, hydrogen chloride levels rarely exceed 300 parts per million.)

Moreover, Southwest Research found that hydrogen chloride does not travel far from the source of a fire. Unlike other fire gases, it is quickly absorbed onto nearby surfaces. Because of this, HCl is less likely to cause harm to those in proximity to the fire.⁽¹⁾



Integrated into the Solid Waste Management Process

Within the electrical industry, vinyl resin suppliers are exploring ways to recycle vinyl wire scrap. On a broader basis, a number of research and development programs have demonstrated that other vinyl products, such as packaging, can be fully integrated into all phases of a responsible, environmentally conscientious solid waste management program: they can be safely landfilled, incinerated without harm to the environment, and are finding growing use in recycled applications.⁽⁴⁾



Backed by an Industry Committed to the Market

The vinyl industry takes an active interest in the electrical market and supports its ongoing development via participation in the code making process, by conducting research on industry-wide issues, and by working with specifiers and users to make sure that vinyl products are used safely and appropriately.



Positioned to Grow with the Future

Vinyl's position in the electrical market today is based on continuing

innovations. Those innovations continue as the industry looks toward the 21st century. Low smoke compounds, new materials for new forms of voice and data transmission, and new materials designed to meet the evolving needs of the appliance, automotive and construction industries are only some of the developments underway within the vinyl industry.



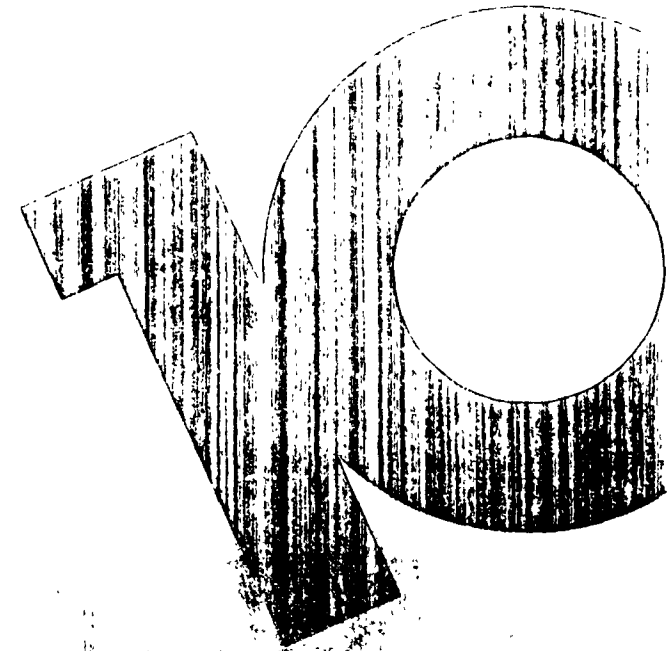
The Material That Offers It All
Vinyl combines safety, performance and marketplace acceptance—the reason why it has earned a reputation as the universally preferred material for severe service applications in the electrical materials marketplace. And the reason why it remains the world's leading electrical material. To find out more, complete the enclosed card.

- [1] "PVC Electrical Nonmetallic Tubing vs. Electrical Metallic Tubing: A Cost-Benefit Comparison," conducted by H-T Technical Services, Berkeley, California, for the Vinyl Institute, September, 1989.
- [2] For complete information on vinyl's fire performance, consult "Fire Properties of Polyvinyl Chloride," published by the Vinyl Institute, 1988.
- [3] For details of the Southwest Research work, consult "Fire Properties of Polyvinyl Chloride," published by the Vinyl Institute.
- [4] For more information about the role of vinyl in the solid waste stream, consult "Vinyl Plastics and Solid Waste: Some Basic Facts," an information kit produced by the Vinyl Institute.



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Today's electrical market is constantly evolving: new requirements to meet, new materials to consider. Yet one of the longest-established materials for electrical applications remains one of the most popular: that material is vinyl. Today, vinyl electrical materials are used in everything from rigid conduit to fiber optic cable, providing safe, dependable service year after year. Here are some of the reasons why the electrical industry continues to look to vinyl when it looks for a material to deliver that performance.



A Record of Demonstrated Safety
Since its first use in the electrical market some 50 years ago as a replacement for rubber insulation, vinyl's use and acceptance have grown in direct proportion to the record of safety it has established. Throughout the years, vinyl products have repeatedly demonstrated their ability to meet the stringent requirements set by the National Electrical Code, the three model building codes and Underwriters' Laboratories for fire, physical and electrical performance.



Versatility
Over 300 UL-listed vinyl compounds exist for insulation and jacketing applications alone. An array of additional products are used in rigid applications like conduit, work boxes, etc. Because vinyl compounds are actually "built" to the specifications of individual applications, they can be tailored to provide myriad properties ranging from low smoke and low flame to outstanding abrasion resistance, dielectric strength and weatherability.



Outstanding Economic

Because only 50 percent of the base vinyl building block (vinyl resin) is based on hydrocarbon feedstocks, raw material costs can be substantially less than they are for competitive materials used in flexible applications like wire and cable. Vinyl's easy processibility gives it an additional economic advantage and its ease of installation is yet another reason why vinyl is gaining market in such areas as electrical nonmetallic tubing. This, combined with the fact that vinyl typically performs with minimum maintenance, gives it a distinct "life-cycle" economic advantage over competitive materials. In fact, in a recent study comparing vinyl conduit with metallic tubing, researchers found a savings of up to 33 cents per dollar in labor and installation costs for the vinyl system.⁽¹⁾



Dependable Service

Whether the application involves transmission of high-speed data, a 600-volt power supply cable or conduit exposed to high humidity, vinyl compounds are formulated to perform. Good dielectric behavior, flexibility at low temperatures, abrasion resistance, moisture resistance, resistance to oil and chemicals, resistance to stiffening, embrittlement and oxidation, and resistance to UV degradation—an electrical installation involving vinyl can be counted on for dependable, low maintenance service.



Demonstrated Superior Fire Performance

Vinyl is one of the most thoroughly fire-tested materials in use today. And, when the entire package of fire

properties is considered together, vinyl meets or exceeds all the appropriate requirements. For instance: rigid vinyl used in applications like conduit is extremely ignition-resistant and will not sustain a flame once the heat source is removed. Flexible vinyl compounds formulated for wire and cable applications typically contain flame-retardant additives that provide the fire properties required by performance standards. These formulations are designed not to spread the fire once the flame source has been removed and to produce low rates of heat release. And, where vinyl is used to replace metals, it's important to note that its inability to conduct electricity helps eliminate the potential fire hazard caused by arcing and shorts.⁽²⁾



Thoroughly Documented Regarding Fire Safety/Health

When vinyl burns, it produces carbon dioxide, carbon monoxide and hydrogen chloride (HCl). Of these, the largest health hazard in fires comes from carbon monoxide, a by-product of virtually any combustible substance.

Hydrogen chloride is an irritant gas. In fact, its distinctive acrid odor can serve as an alert mechanism in those cases where a vinyl product is involved in the early stages of a fire.

In extensive testing it conducted for the Federal Aviation Administration, Southwest Research Institute concluded that hydrogen chloride produced by burning vinyl presented no unusual hazards to fire fighters or others exposed to fire gases. In these tests, Southwest Research found that baboons—who have respiratory systems similar to humans—could survive HCl exposure levels up to 10,000 parts per