

A Guide to  
Insulating  
Materials  
for Tubing  
& Bobbins



The Original  
***Precision***  
Paper Tube Company  
Since 1934

## Dielectric Kraft

Temperature: Class O, 90°C.

Dielectric Strength: 165 VPM min.



The basic, lowest cost insulating material for spiral wound tubing and other products used in the electrical/electronic industries. Dielectric kraft is made from medium density, neutral, natural, high quality electrical grade papers that have been specifically produced for tube winding. Good mechanical and dielectric strength where some moisture absorption can be tolerated.

## Thinwall™

Temperature: Class O to A, 90° to 105°C.

Dielectric Strength: 165 VPM



"Thinwall" tubing is produced from a dielectric kraft paper that has been pre-impregnated with a special phenolic resin. After forming, the tubes are baked to complete the resin cure. This tubing provides many of the desired qualities of round "Resinite" tubing but in square and rectangular forms...excellent mechanical strength and good dielectric properties. "Thinwall" tubing is excellent for fabrication purposes. It can be combined with dielectric kraft to provide special properties and lower cost.

## Vulcanized Fiber

Temperature: Class A, 105°C.

Dielectric Strength: 300 VPM min.



Vulcanized fiber (fish paper) is produced from a cotton rag base paper that provides a high tensile strength (80 times that of kraft) with good arc quenching properties and excellent abrasion resistance. It is a tough, stiff material that is very useful for mechanical and electrical applications.

## Nomex®

Temperature: Class H, 220°C.

Dielectric Strength: 720 VPM



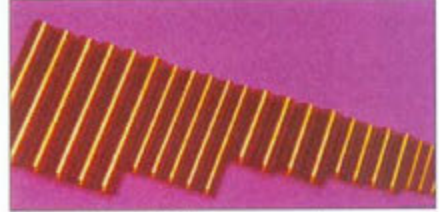
"Nomex" is a polyamide paper made by DuPont that has superior high temperature, high dielectric and good mechanical qualities. Precision Paper Tube Company has developed a method of fabricating square, round or rectangular tubing of this material using a special, compatible binder that provides a laminated, thermally stable, Class "H" insulating tubing. U/L Yellow Card No. E50630.

\*Nomex is a DuPont Registered Trademark.

## Kapton®

Temperature Range: -269° to 400°C.

Dielectric Strength: 7,000 VPM\*



"Kapton" polyimide film is an extremely strong, transparent (amber colored) film that retains its high dielectric strength over a wide range of temperatures. "Kapton" is flame resistant and begins to char only above 800°C. It is self-extinguishing and does not melt. It is unaffected by moisture and there is no known organic solvent for "Kapton".

\*At 25° C., 60 cycles. "Kapton" is a DuPont Registered Trademark.

## Mylar®

Temperature Range: -60° to +150°C.

Dielectric Strength: 7,500 VPM\*



"Mylar" polyester film is an exceptionally strong, durable, transparent film with high tensile, tear and impact strength. It is moisture-vapor resistant and is unaffected by, and does not transmit, oils, greases and volatile aromatics. It is completely inert to water. It has one of the highest dielectric strengths available in a tube form.

\*At 25° C., 60 cycles. "Mylar" is a DuPont Registered Trademark.

## Convolute Laminated

Temperature: Class A, 105° C.

Dielectric Strength: 350 VPM

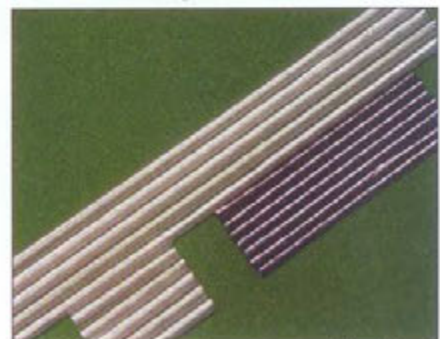


For special applications requiring an extremely fine surface finish, or which call for an especially strong tube, rod or spacer. Precision can furnish convolute wound tubing in a variety of materials. Made of thermosetting resins combined with various base materials such as dielectric paper or cotton cloth. Convolute tubing uses the entire width of the sheet and is wound under high pressure and heat. It is easy to cut, drill, tap, thread and punch with ordinary tools.

## Heat Shrink Mylar®

Temperature Range: -60° to +150°C.

Dielectric Strength: 3,000 VPM min.



Heat shrink "Mylar" makes a superior, high dielectric insulating tubing that is shrinkable as much as 50%. It has a dielectric strength for exceeding other shrinkable materials. It is extremely tough and forms an excellent mechanical barrier. It is moisture-vapor resistant and is unaffected by oils, greases and volatile aromatics.

@ "Mylar" is a DuPont Registered Trademark.

## Resinite™

### Phenolic Impregnated

Temperature: Class A, 105°C.

Dielectric Strength: 290 VPM min.\*



Resinite tubing is produced from a high grade dielectric kraft which is impregnated with a high quality, electrical grade, phenolic resin and then baked at 300°F. This presents a unique combination of low cost coupled with high mechanical strength and good dielectric properties. It will support lugs and terminals and can be fabricated by punching, slitting, cutting and turning. Various formulations are available depending upon the specific characteristics desired. Available in round tubing only. See "Thinwall" for square and rectangular.

\*[Depending upon formulation]

## Flame Retardant Resinite™

Temperature: Class A, 105°C.

Dielectric Strength: 250 VPM min.

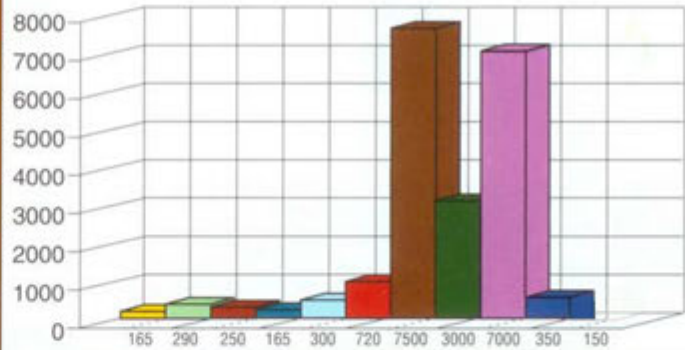


Flame Retardant Resinite tubing is impregnated with special, flame retardant resins and is specified by U/L Yellow Card No. E50630. It is the first time a low cost, moisture resistant, paper base tubing has been recognized by Underwriters' Laboratories, Inc. for electrical and electronic uses in flame retardant applications. FR9120 is the standard grade for basic coil winding and bobbin use and FR9120-1 is the fabricating grade where further fabrication is required such as punching, notching, threading, lugging and slitting.

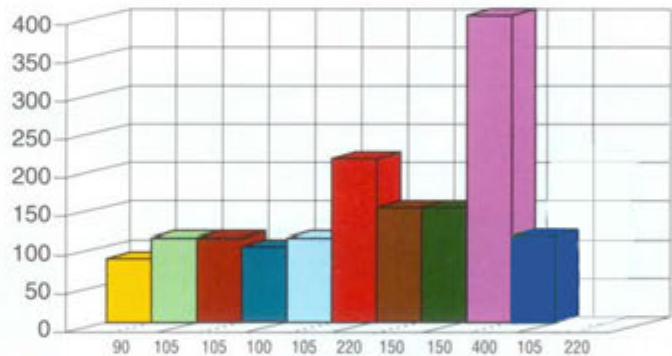
Note: All material properties used above are based on information received from our suppliers using their individual testing methods.

## Material Comparisons

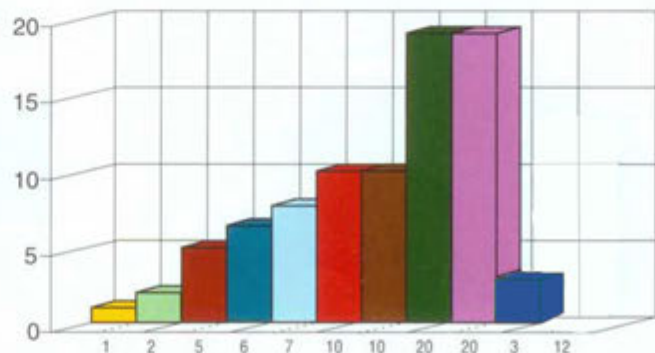
### Dielectric Strength VPM



### Temperature Deg. C.



### Basic Cost Comparison



### Material Key

- |  |  |  |   |
|--|--|--|---|
| <span style="color: yellow;">■</span> Kraft          | <span style="color: lightgreen;">■</span> Resinite | <span style="color: brown;">■</span> FR Resinite | <span style="color: blue;">■</span> Thinwall      |
| <span style="color: cyan;">■</span> Vulcanized Fiber | <span style="color: red;">■</span> Nomex           | <span style="color: darkred;">■</span> Mylar     | <span style="color: darkgreen;">■</span> HS Mylar |
| <span style="color: magenta;">■</span> Kapton        | <span style="color: darkblue;">■</span> Convolute  |  |   |