

# COAXIAL CABLE DIELECTRICS

AMPHENOL

Extruded polyethylene is the most commonly used low temperature coaxial cable dielectric. Its low cost, ease of application, flexibility, high dielectric strength and low dielectric constant make it ideally suited for rf applications.

Cellular polyethylene, known by the AMPHENOL trade mark Polyfoam, is another excellent low temperature dielectric. It is formed by expanding polyethylene with millions of bubbles of an inert gas. The low dielectric constant of 1.5 for polyfoam

compared to 2.26 for solid polyethylene allows the design of lower attenuation and low capacity cables.

Polytetrafluoroethylene (Teflon) is the next most popular cable dielectric, primarily because of its ability to withstand high temperatures. It too has high dielectric strength and a very low dielectric constant. In addition, its ability to withstand exposure to gases and liquids makes it the dielectric choice where other materials would be inadequate.

| Properties   | Polytetrafluoroethylene (Teflon) | Polyethylene                              |
|--|----------------------------------|---|
| Specific gravity   | 2.1-2.3                          | 0.92                                      |
| Specific volume, cu. in. per lb.   | 13.2-12.1                        | 30.1                                      |
| Thermal conductivity, 10 <sup>-4</sup> cal. per sec. per sq. cm. per 1° C. per cm. | 6                                | 8.0                                       |
| Volume resistivity, ohm-cm. (50% relative humidity and 23° C.)                     | 10 <sup>11</sup>                 | > 10 <sup>11</sup>                        |
| Dielectric strength, short-time 1/8-in. thickness, volts per mil                   | 480                              | 460                                       |
| Dielectric strength, step-by-step 1/8-in. thickness, volts per mil                 | 430                              | 420                                       |
| Dielectric constant, 60 cycles   | 2.0                              | 2.26                                      |
| Dielectric constant, 10 <sup>3</sup> cycles  | 2.0                              | 2.26                                      |
| Dielectric constant, 10 <sup>6</sup> cycles  | 2.0                              | 2.26                                      |
| Dissipation (power) factor, 60 cycles  | <0.0002-0.0005                   | <0.0005                                   |
| Dissipation (power) factor, 10 <sup>3</sup> cycles                                 | <0.0002-0.0005                   | <0.0005                                   |
| Dissipation (power) factor, 10 <sup>6</sup> cycles                                 | <0.0002-0.0005                   | <0.0005                                   |
| Water absorption, 24 hr., 1/8 in. thickness, %                                     | 0.00                             | <0.01                                     |
| Effect of weak acids   | None                             | Resistant                                 |
| Effect of strong acids   | None                             | Attacked by oxidizing acids.              |
| Effect of weak alkalis   | None                             | Resistant                                 |
| Effect of strong alkalis   | None                             | Resistant                                 |
| Effect of organic solvents   | None                             | Soluble in aromatic solvents above 60° C. |



# ING COAXIAL CABLES (continued)

Jack Types Described on Page 13

Attenuation and Power Ratings on Page 28

| Military Number<br>RC-YU | AMPHENOL<br>Number | Armor<br>O.D. | Jack<br>O.D. | Jack<br>Type | Shields<br>Outer | Shields<br>Inner | Dielectric<br>O.D. & Type | Center<br>Conductor | V.P.<br>% | Cap.<br>Mfd./Fl. | Max.<br>Covr.<br>Volts Rms. | Nom.<br>Imp.<br>Ohms             | Connector<br>Series |
|--------------------------|--------------------|---------------|--------------|--------------|------------------|------------------|---------------------------|---------------------|-----------|------------------|-----------------------------|----------------------------------|---------------------|
| 17                       | 421-101            | -             | .100         | I            | -                | TC               | .060P 7/8063CW            | 65.9                | 29.5      | 1500             | 50                          | BNC, Subminax                    |                     |
| 118                      | 421-102            | -             | .075         | KEL-F        | -                | S                | .034T 7/385CW             | 69.5                | 28.5      | 1000             | 50                          | Subminax                         |                     |
| 171A                     | 421-145            | -             | .105         | KEL-F        | -                | S                | .063T 7/385CW             | 69.5                | 19.5      | 1200             | 75                          | BNC, Subminax                    |                     |
| 100                      | 421-141            | -             | .141         | KEL-F        | -                | S                | .103T 7/385CW             | 69.5                | 35.5      | 650              | 93                          | BNC, Subminax, TNC               |                     |
| 100A                     | 421-143            | -             | .145         | KEL-F        | -                | S                | .102T 7/385CW             | 69.5                | 15.0      | 1500             | 95                          | BNC, Subminax, TNC               |                     |
| 187                      | 421-106            | -             | .110         | VII          | -                | S                | .063T 7/385CW             | 69.5                | 19.5      | 1200             | 75                          | BNC, Subminax                    |                     |
| 188                      | 421-105            | -             | .110         | VII          | -                | S                | .060T 7/80675CW           | 69.5                | 29.0      | 1200             | 50                          | BNC, Subminax                    |                     |
| 195                      | 421-111            | -             | .155         | VII          | -                | S                | .102T 7/385CW             | 69.5                | 15.0      | 1500             | 95                          | BNC, Subminax, TNC               |                     |
| 196                      | 421-109            | -             | .100         | VII          | -                | S                | .034T 7/385CW             | 69.5                | 28.5      | 1000             | 50                          | Subminax                         |                     |
| 200                      | 421-141            | -             | .745         | VI           | S                | S                | .500SST 19/.03785         | 84.0                | 26.5      | 3200             | 50                          | LT                               |                     |
| 210                      | 421-100            | -             | .242         | V            | -                | S                | .146SST 22SCW             | 84                  | 13.5      | 750              | 93                          | N, C, TNC, BNC, BR, UHF, PUSH-ON |                     |

Cables with --- numbers are manufactured to specifications other than MIL-C-17

S—Silvered Copper    SCW—Silvered Copperweld    TC—Tinned Copper    TT—Teflon Tape    T—Teflon    SST—Semi-Solid Teflon    CW—Copperweld