Application Guide for Product Selection

Background

Selection of the best high voltage connector for a given application is important not only for reliable performance but also cost. This guide will assist the user in making the best match between system requirements and Reynolds high voltage connectors, cable assemblies and cable.

Criterion	Guide
Voltage Rating	Reynolds rates voltage as the "maximum operating voltage." Ratings are for steady state DC. The user should define the maximum DC voltage of the proposed circuit and select a connector rated at least 25% above the maximum circuit operating voltage. If the circuit contains voltage with an AC component or is pulsed DC, the user should consult with Reynolds engineering department before choosing a connector.
Altitude Operation	If a proposed application involves operation at a reduced pressure equivalent to 15,000 feet or higher, the user should refer to p. 42 for background on the relationship of voltage stand off and atmospheric pressure. Connectors presented in this catalog are clearly rated concerning operation at altitude. Reynolds altitude rated connectors use precision elastomeric seals to effect an altitude seal and requires no silicone grease to operate reliably at their rated voltage.
Operating Temperature	The user should accurately establish the operating temperature range of any application for high voltage connectors. This is very important for sea level applications and becomes critical for altitude operation. The user should be realistic in evaluating the temperature range. Connectors designed to operate over a range of -55°C to +125°C are considerably more expensive than those designed for room ambient operation or even -40°C to +70°C. The operating temperature is clearly indicated for all connectors in this catalog.
Plugs	Plugs, ends that are attached to cable assemblies, are available in some cases as a bag assembly for installation by the user. Reynolds generally discourages the purchase and installation of these connectors by the user especially if the final assembly is to be used at altitude and/or extremely cold temperature, for several reasons. (1) Extreme cleanliness must be observed to preclude conductive contamination. (2) If the connector requires bonding (most do) only an experienced person with all the necessary potting room equipment should attempt the installation. (3) Assemblies must be voltage stress tested and, when destined for use at altitude, in an altitude chamber capable of simulating the equivalent of 70,000 feet.
Receptacles	Receptacles also must be kept clean, particularly in the interface area. If the rear portion of the receptacle requires encapsulation, it is best to have this done and tested by Reynolds prior to shipment. However, the potting of a receptacle is usually straightforward and can be accomplished by following the material manufacturer's printed instructions.
Wire and Cable	There is no single wire or cable suitable for all applications and conditions. Following are comparisons: **FEP** *Advantages:* High dielectric Abrasion resistant Good corona characteristics Can be etched and silicone rubber coated Resistant to most fluids including Coolanol™ *Disadvantages:* • Must be etched for bonding or encapsulation **Silicone Rubber** *Advantages:* Fair dielectric strength Good flexibility Easy to bond and encapsulate with silicone rubber *Disadvantages:* • Relatively large diameter compared to FEP • Susceptible to pinholes and wire migration • Incompatible with Coolanol™ and some other oil dielectrics
FEP Wire & Cable Etching- Coating	FEP cable can be etched and coated with silicone rubber for encapsulation using silicone rubber compounds or bonding to molded silicone rubber components using approved elastomeric bonding materials. FEP wire that has been etched but not coated can also be used for encapsulation or bonding to most epoxy materials. These processes give FEP wire a versatility found in no other high voltage wire or cable and make it an excellent choice for most high voltage applications.
Cable Routing and Bend Radius	In routing cable, the user should take care to avoid making sharp bends. Sharp bends put added stress on the wire strands and can create a corona stress point. Sharp or rough metal edges in the routing area should also be eliminated especially when using silicone cable. Torquing a cable excessively during routing should be avoided.
Liquid Dielectrics	Reynolds connectors use silicone rubber seals and "O" rings to effect dielectric and pressure sealing. Silicone rubber, including silicone rubber cable, is incompatible with many dielectric oils and Coolanol™ dielectric. While these are excellent dielectric mediums they can cause silicone rubber to swell. Some Reynolds connectors offer fluorsilicone seals and/or insulators for use with these dielectrics. Only FEP or PFA cable should be used where these dielectrics are present.
Loss Line Cable	Reynolds manufactures a complete line of high voltage loss line or distributed loss R.F. attenuation cable. The user requiring R.F. attenuation should consider using loss line. Reynolds engineers are available for application consultation.
Corona	Users with concerns about corona should consult Reynolds engineering department before making a high voltage connector choice. Reynolds is extremely knowledgeable concerning the origins of corona, its effects and possible remedies. Reynolds makes no claim to manufacturing "corona free" connectors, cable or cable assemblies. Reynolds does, however, maintain extensive corona research and test data on its products with the objective of manufacturing connectors as resistant to the effects of corona as possible. Reynolds is noted in the industry for its corona detection equipment and technical competence to analyze the existence and level of corona in a connector or circuit.