



## APPLICATION NOTES FOR USE WITH SPELLMAN HIGH VOLTAGE POWER SUPPLIES

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#### What's the voltage rating of RG8-U coaxial cable?

Output cable and connectors are not trivial items for power supplies where output voltages can be 100,000 volts or higher. The cables and connectors used must function together as a system to safely and reliably access and provide the power supplies output for customer usage.

In many high voltage power supply applications, a shielded polyethylene coaxial cable is used. Polyethylene cables provide excellent high voltage dielectric isolation characteristics in a small but robust form factor. The shield conductor provided in a coaxial cable functions as a "Faraday Shield" for the center conductor of the cable that is referenced to the high voltage potential. If any breakdown in the main insulator occurs, the high voltage current will be bypassed to the grounded shield conductor that surrounds the main insulator. This inherent safety feature is one benefit of using a coaxial high voltage output cable.

RG8-U has long been used as a high voltage output cable in the high voltage industry. There is a variation of RG8-U that utilizes a solid polyethylene core. Specifications for this cable do not specify actual "high voltage" ratings, since this cable was not designed and fabricated for high voltage usage. The reality is, there are no high voltage ratings for RG8-U. Over the years, others in the HV industry have used this cable at 20kV, 30kV and even higher voltages. Spellman does use RG8-U cable, but typically limits its usage to applications where the maximum voltage will be 15kV or less, unless specifically called out by customer requirements.

For voltages above 15kV where a coaxial polyethylene cable is required, Spellman typically uses cables designed/manufactured for high voltage usage.

These cables are of the same general design; as described above but the insulating core material diameter has been increased appropriately to obtain the desired dielectric insulating capability required. Frequently higher voltage versions of these cables utilize a thin semiconductor "corona shield". This corona shield is located between the metallic center conductor and the main polyethylene insulating core. This corona shield helps equalize the geometric voltage gradients of the conductor and by doing so reduces the generation of corona.

A high voltage cable and connector system can only be as good as the materials used to make it. Using cables that are designed, specified and tested specifically for high voltage usage assures that these materials are used within their design guidelines.