

The Radio Hotel Coax Specs – Dissecting Series #3

By Rick Hiller – W5RH

We all use coaxial cables for our antenna systems at pretty much any frequency allocated to the Radio Amateur. Most Hams probably know very little about the characteristics of the cable they are buying. Knowledge probably limited to the characteristic (or surge impedance) and, maybe, the attenuation or matched loss rating. Coaxial cable has a slew of additional characteristics that should be considered, depending on your situation and end use. Let's have a look at some of these lesser known cable attributes. Hint: Google "coax", plus any of **BOLDed** words, for more info.

Power handling – important at any frequency, but, with too high a power level coupled with a lossy cable could certainly cause melting of the di-electric. Also, **Voltage Breakdown** is important if you are going to use antennas that require tuned feeders (ATU in the shack) and run a high SWR between the ATU and the antenna. Higher SWR generates higher voltages along the cable length. This is not good practice on coax anyway.

The type of **Shielding** used – stranded braid, solid foil or both, is important at higher frequencies to lessen the signal loss and to keep locally generated noise from entering the coax in its' long run from the antenna. The **outside jacket material** is important for cables out in the sun (UV protection) or buried under ground for protection from wet or age deterioration. Also, outgassing and long term breakdown for some materials is a concern if you install it and never want to mess with it for years. **Crush Strength** is the pressure it takes to deform the cable physical dimensions that affect the cables inherent **VSWR consistency**. Cars running over the cable or cable fed thru a door jamb on a car can crush the cable. You should look at the uniformity of the **dielectric OD** and the **OD of the cable itself**. These are really manufacturing measurement /tolerance concerns, but ones you should know about. In this regard, stay away from "hamfest, used coax". New cable is more money, yes, but much less of a headache when the used stuff starts to fail.

A couple of installation concerns about coax. One is the weight of the cable. Especially when center feeding a long dipole (hanging stress) or stretching elevated cable across an area (always use a catenary wire from which to hang the coax). Last, but not least, is **Bend Radius**. This specification is important when placing coax around corners. Each coax cable type has a specified minimum radius that it can be bent to in order to maintain the **VSWR consistency** and **characteristic impedance**. Depending on the **di-electric, solid or foam or air**, some cables have a very large minimum radius and others, smaller cables, have a tight radius. Always install and bend on the conservative side to save yourself problems in the future.

The characteristics of the coax that should concern you are very dependent on your needs and objectives. Big difference in the coax type used for running full power on tuned feeders to a 160/80 meter dipole, compared to feeding stacked 2 meter Yagi's at 120 feet. Even though certain characteristics are not of a big concern for your station, it is nice to know all about coax. **Two Power Point/PDF's to Google** are:

Feed Me With Some Good Coax – W5YI Group and **All Coaxial Cables Are Not Created Equal -- VE3EJ**

Lastly, some guidelines for coaxial use and deployment:

- 1 --Before you deploy your new coax into your antenna system, measure VSWR in a matched load condx in the frequency range it will be used, also measure the loss. Keep a record.**
- 2 --Install high quality connectors properly, whether solder-on or the new, popular crimp style. Your antenna system is a series electrical circuit, so any single failure is a system level failure.**
- 3 --When deploying, watch the bend radius and crush performance, if taking it thru a window or car door, etc.**
- 4 --Choke the coax at critical points to avoid common mode, antenna current problems and to help with lessening local received noise pick-up.**
- 5 --Use a minimum of RG-214 for 1.5 KW work. Choose coax with less than 1 dB of total system transmit attenuation for the length/frequency you require.**

Next time.... Small "Mag" Loops **Enjoy your hobby -- W5RH**

*The purpose of **The Radio Hotel** is to give you a practical kick start into exploring the workings of antenna systems. Google the buzz words and find out what they mean. Read up on antenna system theory to see how it all works together. You will be glad you did.*