



Coaxial Cable Selection for CCTV

RG-59/U is a designator for 75-ohm impedance coaxial cable of which there are several varieties, each having some slightly different characteristics. There are also other 75 ohm cable types, such as RG-6/U (18 AWG) and RG-11/U (16 AWG). These have larger gauge conductors and are for use where longer cable runs are necessary.

Two important characteristics of coaxial cable are the gauge, or diameter, of the center conductor, and the type of shield. A larger diameter center conductor will have less signal loss for a given distance. Typical gauges available in RG-59 cables are 20 AWG (American Wire Gauge), 22 AWG, and 23 AWG. The number of the gauge and the physical diameter are inversely proportional. That is, 20 AWG is larger than 22 AWG, etc.

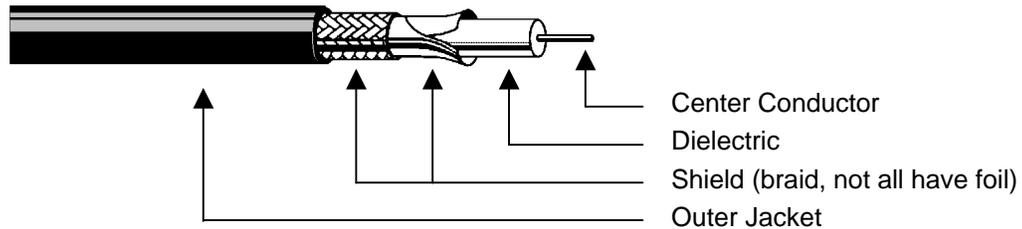
The second characteristic, shielding, is also important. Cable for CCTV use should have a 95% coverage copper braided shield. The shield must be effective by conducting any externally induced voltages to ground. A good shield and a good electrical connection to the connector are of prime concern. It must also have low resistance to reduce differences in ground potentials at either end of the cable.

Cable Types:

- CATV cable typically has a copper-coated, solid steel center conductor and the shield is typically aluminum foil with a 40% aluminum braid. It does not make good connections with BNC-style connectors, in particular, the twist-on style. The jacket of the cable is usually marked "CATV", indicating that this cable is designed for Community Antenna TeleVision systems. Another marking, "MATV", Master Antenna TeleVision is also sometimes seen. Either marking indicates a cable construction designed for significantly higher frequency ranges than found in CCTV. CATV or MATV cable should never be used for CCTV systems.
- Cable designed for CCTV systems should have a good 95% coverage, braided-copper shield and a center conductor of 20 or 22 AWG copper. The use of copper conductors is important in the frequency ranges used for baseband CCTV signals. The jacket, or the outer cable covering, is sometimes made from PVC (PolyVinyl Chloride). PVC is an excellent and cost effective jacket material but is not intended for use in air plenum returns of building air conditioning systems. Building codes usually restrict the open use of PVC cables in areas used as air returns. Cable used outdoors should be rated for exposure to ultraviolet (UV) light.
- Cable meeting CCTV requirements is also available in a plenum variety. Cable that is rated for plenum installation has an outer jacket is made from a flame-retardant material. Plenum cable usually has a slightly smaller overall diameter than PVC due to the thinner jacket material and is slightly less flexible.
- Cable is available in both stranded and solid center conductors. Stranded conductor would perform better where flexibility is a requirement, such as a camera mounted on a pan & tilt assembly or in making connections to a chassis that is mounted on slides within a rack.

- The dielectric material is also a factor that should be considered as it has a direct bearing on the signal transmission distance. The two types are solid polyethylene or foam polyethylene. The foam type has a lower capacitance and lower signal attenuation but, if used outdoors, can absorb moisture if the jacket is broken.

Coaxial Cable Construction



Cable Distance Limitations

| Picture Quality | Maximum Cable Run feet (meters) | | |
|--|------------------------------------|----------------------------|----------------------------|
| | RG-59/U | RG-6/U | RG-11/U |
| Dim, faint picture Cable Amplification Required | Greater than 1100 (350) | Greater than 1500 (450) | Greater than 2400 (750) |
| Usable picture | 1100 (350) | 1500 (450) | 2400 (750) |
| Clean picture | 820 (250) | 1000 (300) | 1600 (500) |
| Best Picture | 400 (120) | 530 (160) | 820 (250) |

These cable distances are typical and may vary slightly from manufacturer to manufacturer. Also, within a single manufacturer's selection, several different grades of cable may be found.