

## Anatomy of Coaxial Wire Used to Carry Video

A coaxial cable is one that consists of two conductors that share a common axis. The inner conductor is typically a straight wire and the outer conductor is typically a shield that might be a foil or braided.

*Starting from the inside and working our way out:*

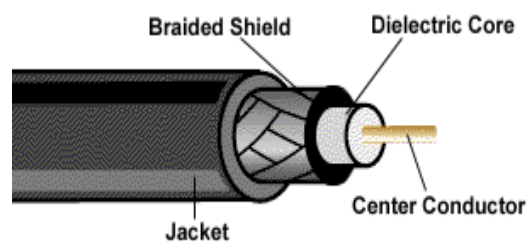
The center conductor carries the baseband video signal. The standard is to use a coaxial cable with a solid copper center conductor, not stranded. All conductors lose a certain amount of signal over distance. This is due to resistance. The "bigger" a conductor is (gauge), the less signal is lost over distance.

The next layer, the dielectric, is the opaque, white-waxy part of the cable. The dielectric of a coaxial cable serves one purpose - to maintain physical support and a constant spacing between the inner conductor and the outer shield. In order to deliver superior performance, a well-made cable keeps tight tolerance on the spacing between the inner conductor and the outer shield. Most practical cable manufacturers use a variety of hydrocarbon-based materials such as polystyrene, polypropylenes, polyolefins and other synthetics to maintain structural integrity.

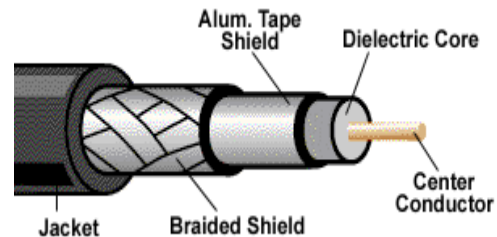
The next layer is composed of braided wire or foil and termed "shielding." The purpose of is to shield the conductor from stray "outside" signals or interference also known as "ingress." In addition it keeps the signal being transmitted along the conductor *inside* the cable from leaking out, also known as "egress." Most RG6 coax cables have between two layers (dual) or four layers (quad) of shielding.

The final layer is the jacket. This is just for insulation and to protect the inner elements.

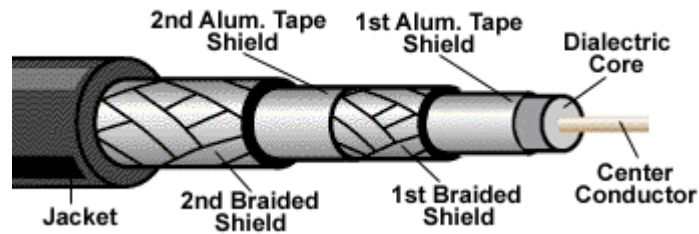
### Regular Coax Cable:



### Dual-Shield Coax Cable:



**Quad-Shield Coax Cable:**



**Chart of Signal Loss per 100ft**

Coax Cable Signal (Attenuation) Loss per 100ft			
Loss at	RG-59	RG-6	RG-11
1MHz	0.4dB	0.2dB	0.2dB
10MHz	1.4dB	0.6dB	0.4dB
50MHz	3.3dB	1.4dB	1.0dB
100MHz	4.9dB	2.0dB	1.6dB
200MHz	7.3dB	2.8dB	2.3dB
400MHz	11.2dB	4.3dB	3.5dB
700MHz	16.9dB	5.6dB	4.7dB
900MHz	20.1dB	6.0dB	5.4dB
1000MHZ	21.5dB	6.1dB	5.6dB

**Insertion Loss**

More commonly called attenuation, insertion loss is the loss of signal power between two points. Items that lead to signal loss are excessive cable length, temperature, humidity, and excess return loss.

All devices (such as splitters, amps, etc) that you add to a cable line have insertion loss.

In a cable modem environment, you want to have as little insertion loss as possible throughout the house.

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