

Introduction



Bringing People Closer

Today, wireless communication is part of everyone's life as we increasingly communicate with each other and source information through networks such as cellular phones, TV broadcasting and WLAN. The strength of Belden is to anticipate market demands, adapt, invent and innovate to meet changing needs for increased bandwidth and easy installation.

Belden offers one of the most comprehensive, economical and modern ranges of reliable 75 Ohm and 50 Ohm coaxial cable products on the market. The distribution and drop coaxes feature Belden's innovative, high-performance Duobond Plus® shielding and/or Belden's Duobond® II shield.

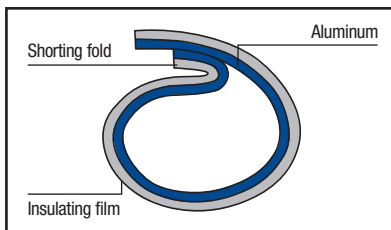
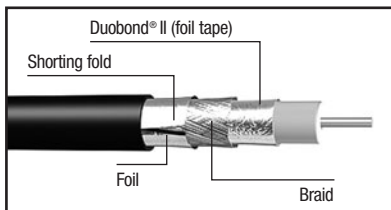
Key Applications

- Cable TV
- Satellite dish technology
- Broadband applications

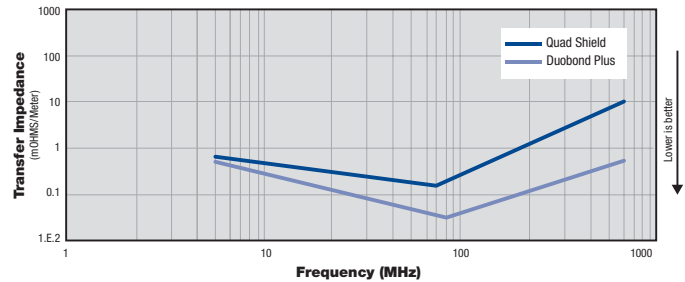
Special Features

75 Ohm CATV

- **Duobond Plus®**
Belden's Duobond Plus® has a three-shield construction consisting of a Duobond® II (foil tape) surrounded by a braid and an outer layer of foil with a unique shorting fold which creates the effect of a solid metal conduit. This combination offers superior high frequency shielding when compared with traditional Quad shields.



Duobond Plus® is faster to install, because the outer tape shield is bonded to the jacket and can be stripped easily in one step. Furthermore, this construction gives Duobond Plus® a smaller bending radius, greater flexibility and, compared to quad shielded coax, a 10 percent weight reduction.



Lower transfer impedance means better shielding performance.

Belden offers two different versions of Duobond Plus®:

- Better-Than-Quad (BTQ) with 50% shielding coverage.
- Better-Than-Triple (BTT) with 40% shielding coverage.

Better performance and easier installation are reasons why Duobond Plus® coax cables are so popular and widely used.

- **Duobond® II**

The foil/braid type combines Duobond with an outer braid. This is added to provide greater protection against interference and to increase overall tensile strength. The combination foil/braid shield combines the advantages of 100% foil coverage with the strength and low DC resistance of the braid.

- **FRNC/LSNH**

Belden has developed low-smoke (LS), fire-retardant (FR) and zero-halogen (ZH) cables. These three properties are annotated as FRNC/LSNH (also known as RNC/LSZH).

Introduction



What is Class A?

The demands for screening attenuation and transfer impedance of the CATV cables are defined by European Standard EN50117-2:

1. Drop, indoor 5 MHz to 1000 MHz
2. Drop, outdoor 5 MHz to 1000 MHz
3. Trunk and Distribution 5 MHz to 1000 MHz
4. Drop, indoor 5 MHz to 3000 MHz
5. Drop, outdoor 5 MHz to 3000 MHz

EN-50117-1 is the version for coax cables. Part 1 is the generic specification. This part requires that the test method of transfer impedance and the screening attenuation accords to EN 50289-1-6.

EN 50117 Screening Classes

Class A++	105 dB from 30 MHz to 1000 MHz (screening attenuation) 95 dB from 1000 MHz to 2000 MHz (screening attenuation) 85 dB from 2000 MHz to 3000 MHz (screening attenuation) 0.9 mOhm/m from 5 to 30 MHz (transfer impedance)
Class A+	95 dB from 30 MHz to 1000 MHz (screening attenuation) 85 dB from 1000 MHz to 2000 MHz (screening attenuation) 75 dB from 2000 MHz to 3000 MHz (screening attenuation) 2.5 mOhm/m from 5 to 30 MHz (transfer impedance)
Class A	85 dB from 30 MHz to 1000 MHz (screening attenuation) 75 dB from 1000 MHz to 2000 MHz (screening attenuation) 65 dB from 2000 MHz to 3000 MHz (screening attenuation) 5 mOhm/m from 5 to 30 MHz (transfer impedance)
Class B	75 dB from 30 MHz to 1000 MHz (screening attenuation) > 65 dB from 1000 MHz to 2000 MHz (screening attenuation) > 55 dB from 2000 MHz to 3000 MHz (screening attenuation) 15 mOhm/m from 5 to 30 MHz (transfer impedance)
Class C	75 dB from 30 MHz to 1000 MHz (screening attenuation) > 65 dB from 1000 MHz to 2000 MHz (screening attenuation) > 55 dB from 2000 MHz to 3000 MHz (screening attenuation) 50 mOhm/m from 5 to 30 MHz (transfer impedance)

New Technologies Need Better Cables

- From analog to digital.
- More protection from electromagnetic interference for multimedia applications (telephony, internet or video-on-demand).
- Interactive services like Two-Way-TV (TWTV) need return-path capable cables, according to class A.
- Backwards: 5 - 30 (65) MHz - Forward: 47 (80) - 862 MHz.

Euroclass – European Union to Harmonize Test Standards and Transform All the National Regulations

The Construction Products Directive (CPD) was adopted in 1989. In 2002, the European Union published a series of harmonised test standards, called: Euroclass according to a classification in decreasing quality order from A to F:

Euroclass (draft: 2003)

- A - no inflammable material
- B* - Low flame height and heat production
- C* - Moderate flame height and heat production
- D* - Heat production comparable to that of burning construction wood
- E - Moderate flame height
- F - No fire performance requirement

* B = EN50399-2-2, C and D = EN50399-2-1

CENELEC is currently working on a final version to cover the next years.

Introduction



50 Ohm Wireless

Belden's 50 Ohm RF cables provide best-in-class transmission performance and superior EMI/RFI shielding for greater noise reduction. They are ruggedly constructed and designed to be flexible for easy installation and routing.

Features include:

- **Lowest Loss**

Belden's 50 Ohm RF cables provide the lowest loss of any land mobile radio-type coaxial cables on the market (from 5% to 10% lower, depending on the design and frequency). The result is better signal transmission at the same distance, or longer transmission distance with less attenuation. All cables are 100% sweep tested to 6 GHz to assure performance in future high frequency applications.

- **Low VSWR**

VSWR is guaranteed to be 1.25:1 maximum over all frequencies (RL = -19 dB).

- **High Velocity of Propagation**

The foamed high-density polyethylene insulation provides the highest velocity of any land mobile radio-type flexible coaxial product on the market. The high-density material properties provide superior crush resistance to minimise impedance variations and return loss, ensuring high performance both before and after installation. (Part number 7805 utilizes a solid PE dielectric).

- **Excellent Phase Stability**

Belden's 50 Ohm RF cables exhibit excellent phase stability over both temperature changes and flexing, resulting in improved signal integrity and reliability.

- **Superior RF Shielding**

The combination foil/braid shield provides in excess of 100 dB of effective EMI/RFI shielding.

- **Unbonded Foil Shields (on smaller constructions prevent connector shorting)**

In the smaller designs – RF200 and under – the spacing between the foil shield and the centre pin of the connector is extremely small. During the cable stripping process, bonded foil shields tend to tear if not cleanly cut, leaving very small foil "stringers" that can short the shield to the center conductor. Unbonded shields allow for the tape to be cut back from the dielectric, thereby eliminating the potential shorting problem. The unbonded shields are featured on RF100A, RF100LL, RF195 and RF200. Larger constructions – including the new water-blocked (WB) versions – have sufficient spacing between the shield and centre pin, and therefore feature bonded foil shields.

- **Unique Design**

Belden's RF100LL is the only design of its type. It features a slightly larger center conductor and foamed polyethylene insulation, while maintaining the dimensions of the MIL-Spec cable, eliminating the need for special connectors. These two features combined produce an attenuation that is approximately 7% lower than the standard solid polyethylene RF100 design.

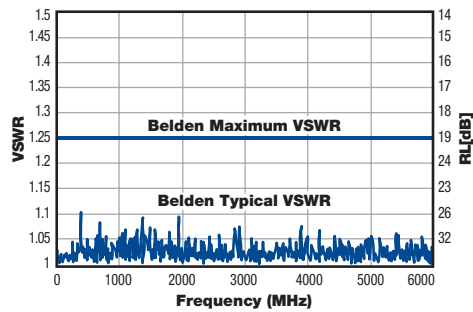
- **Connector Compatibility**

The RF series cables are compatible with all standard land mobile radio-type connectors, including Times Microwave, RF Industries, Amphenol, Trompeter, EF Johnson and others.

- **Conformable Coax**

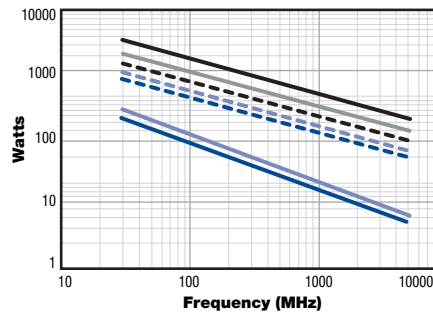
For applications requiring low VSWR and high shield effectiveness, Belden's complete product range of 50 Ohm conformable coax cables offers unequalled performance. These patented cables serve as a replacement for semi-rigid cables and, unlike semi-rigid, they are hand formable.

Guaranteed VSWR



Note: Voltage Standing Wave Ratio (VSWR) is a measurement of the reflected power in a cable or instrument. The higher the VSWR the poorer the transmission characteristics of the cable.

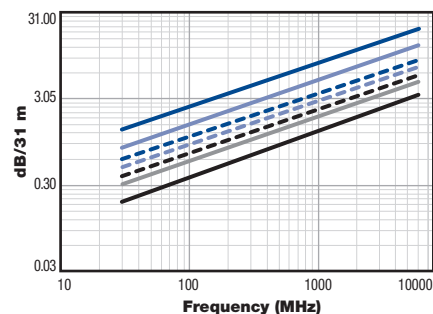
Power Rating



Legend:

— RF100A
— RF100LL
- - - RF195
- - - RF200
- - - RF240
— RF300
— RF400

Attenuation



Phase Stability

Phase Attribute	Typical Range (0.45 GHz to 6.0 GHz)	
	ppm/°C	Degree/GHz/m
Temperature (-40°C to +55°C) ¹	± 9	± 0.6
Bending & Flexing (25 cycles) ²	NA	± 1.1

1: Per IEC 60965-1 clause 8.8

2: Per IEC 60965-1 clause 8.6

Introduction



RF Cables Cross-Reference Guide

RG Type	Cable Type	Belden Part No.	Amphenol	Commscope	Harbour Industries	Times Microwave
RG-174	RF100A	7805	–	–	HPP100	LMR®-100A
	RF100LL	7805R	–	–	–	–
RG-58	RF195	7806A	–	WBC™-195	HPP100	LMR®-195
	RF195	7806R	–	WBC™-195R	on request	on request
	RF200	7807A	–	WBC™-200	HPP200	LMR®-200
	RF200	7807R	–	WBC™-200R	on request	on request
RG-8X	RF240	7808A	TWB 2401	WBC™-240	HPP240	LMR®-240
	RF240	7808R	TWB 2401-FR	WBC™-240R	on request	on request
	RF240	7808WB	–	–	–	–
Intermediate	RF300	7809A	–	WBC™-300	HPP300	LMR®-300
	RF300	7809R	–	WBC™-300R	on request	on request
	RF300	7809WB	–	–	–	LMR®-300-DB
RG-8	RF400	7810A	TWB 4001	WBC™-400	HPP400	LMR®-400
	RF400	7810R	TWB 4001-FR	WBC™-400R	on request	on request
	RF400	7810WB	–	–	–	LMR®-400-DB

WBC™ is a Commscope trademark.
LMR® is a Times Microwave trademark.

RG Cable Replacement Guide

Belden Part No.	Size	Replacing
7805	RF100A	RG-174/U
7805R	RF100LL	RG-174/U
7806A	RF195	RG-58/U
7807A	RF200	RG-58/U
7808A	RF240	RG-8X
7809A	RF300	RG-8X
7810A	RF400	RG-8/U

Availability

Many of these cables are available off the shelf from distributors. If you have a new or unusual application or you cannot find a CATV cable in this catalog section that meets your technical requirements contact technical support at +31-77-3875-414 or techsupport.venlo@belden.com.

Corresponding Literature

Product Bulletins

- NP 182: Belden expands line of low loss 50 Ohm RF transmission cable
- NP 186: RF500 and RF600 low loss 50 Ohm
- NP E101: Messenger cable
- NP 230: Wi-Fi Tower shielded twisted pair