

BULLETIN

**New flooded
RF coaxial cables
offer superior
water-block
protection in
wet environments.**



Belden® Expands Line of Low Loss 50 Ohm RF Transmission Cable

Today, wireless communications are part of everyone's life. From two-way radios, to cellular phones, to television broadcasting, people communicate more and more through wireless networks. Such networks are constantly evolving, offering additional services that demand greater bandwidth and reliability.

All wireless systems use antennas, which are installed on different types of towers. Although these antennas are used for various applications, they have a similar medium for signal and power transmission: coaxial cable. Now Belden offers an expanded line of 50 ohm (Ω) radio frequency (RF) coax cables specifically engineered for these increasingly demanding wireless environments. New to the series are three gel-filled, water-blocking cables that provide superior protection in excessively wet environments.

Best-in-Class Performance

Belden's 50 Ω 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 ease of installation and routing.

Features include:

> **Lowest Loss:** Belden's 50 Ω RF cables provide the lowest loss of any land mobile radio-type

coaxial cables in 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 = -19dB). See graph on page 6.
- > **High Velocity of Propagation:** The foam 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 minimize 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 Ω 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 100dB 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 center 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 center pin, and therefore feature bonded foil shields.

> **Unique Design:** Belden's RF100LL is the only design of its kind. It features a slightly larger center conductor and foam polyethylene insulation, while maintaining the dimensions of

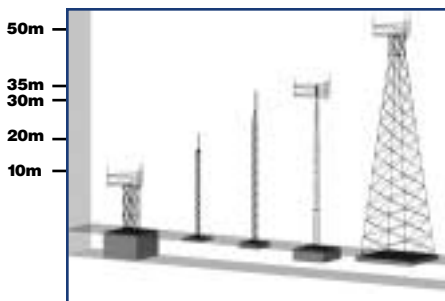
the MIL-Spec cable, eliminating the need for special connectors. These two features combined produce an attenuation that is approximately 7% lower than the standard solid polyethylene RF100 design.

> **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. Please consult Belden's Web site at www.belden.com for a complete listing.

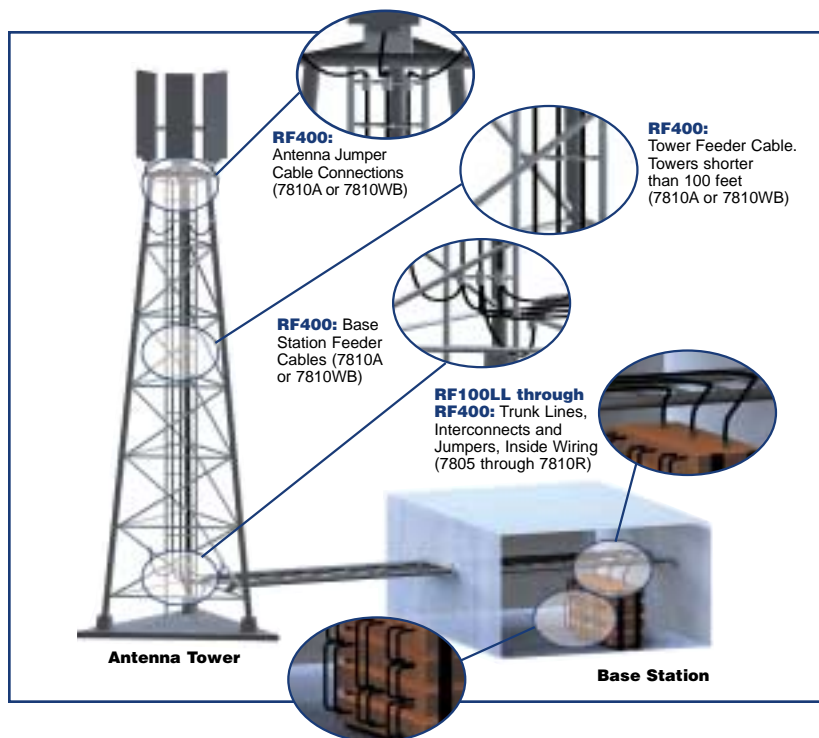
Product Availability

Belden 50Ω RF cables are available with weather-resistant polyethylene jackets and in a PVC-jacketed NEC CMR riser-rated version, as well as the new PE jacketed gel-filled versions, in reels of 500 and 1,000 feet. Contact Belden Electronics Customer Service department at 1-800-BELDEN-1 and request a quote through a Belden distributor.

Product Applications



Various tower configurations that utilize Belden low loss 50 Ohm transmission cable.





Description	Part No.	UL NEC/ C(UL) CEC Type	Standard Lengths		Standard Unit Weight		Conductor (stranding) Diameter Nom. DCR	Nominal Core OD		Shielding Materials Nom. DCR	Nominal OD		Nom. Imp. (Ω)	Nom. Vel. of Prop.	Nominal Capacitance		Nominal Attenuation		
			Ft.	m	Lbs.	kg		Inch	mm		Inch	mm			pF/Ft.	pF/m	MHz	dB/100 Ft.	dB/100m
RG-174 Type • 25 AWG Solid .018" Bare Copper • Duofoil® + 90% Tinned Copper Braid Shield																			
Solid Polyethylene Insulation • Black PVC Jacket																			
RF100A 80°C	7805 new		100	30.5	2.4	1.1	25 AWG	.061	1.55	Duofoil	.110	2.79	50	66%	31.2	102.4	30	3.8	12.4
			500	152.4	6.0	2.7	(solid)			+ 90% TC								50	4.9
			1000	304.8	10.0	4.5	.018"			Braid							150	8.6	28.2
							BC			9.1Ω/M'							220	10.4	34.2
							32.0Ω/M'			29.9Ω/km							450	15.2	49.9
							105.0Ω/km										900	22.0	72.3
																	1500	28.7	94.3
																	1800	31.7	104.0
																	2000	33.4	109.7
																	2500	37.8	124.2
																	3000	42.0	137.8
																	4500	52.3	171.5
																	5800	60.9	199.8
																	6000	62.0	203.3

Mates with standard RG-174 connectors.

RG-174 Type • 24.5 AWG Solid .020" Bare Copper • Duofoil + 90% Tinned Copper Braid Shield																			
Foam HDPE Insulation • Gray PVC Jacket																			
RF100LL 80°C	7805R new	NEC:	100	30.5	2.4	1.1	24.5 AWG	.060	1.52	Duofoil	.110	2.79	50	73.5%	26.2	86.0	30	3.5	11.5
		CMR	500	152.4	6.0	2.7	(solid)			+ 90% TC								50	4.6
		CEC:	1000	304.8	10.0	4.5	.020"			Braid							150	8.0	26.1
		CMG FT4					BC			9.4Ω/M'							220	9.6	31.6
							27.3Ω/M'			30.8Ω/km							450	14.0	46.1
							94.2Ω/km										900	20.2	66.4
																	1500	26.6	87.3
																	1800	29.5	96.7
																	2000	31.2	102.3
																	2500	35.4	116.3
																	3000	39.4	129.2
																	4500	50.0	164.2
																	5800	59.0	193.6
																	6000	60.6	198.7

Mates with standard RG-174 connectors.

RG-58 Type • 19 AWG Solid .037" Bare Copper • Duofoil + 90% Tinned Copper Braid Shield																			
Gas-injected Foam HDPE Insulation • Black Polyethylene Jacket																			
RF195 80°C	7806A new		500	152.4	14.5	6.6	19 AWG	.110	2.79	Duofoil	.195	4.95	50	77%	24.3	79.7	30	2.0	6.6
			1000	304.8	26.0	11.8	(solid)			+ 90% TC								50	2.5
							.037"			Braid							150	4.0	13.3
							BC			4.2Ω/M'							220	4.9	16.1
							7.6Ω/M'			13.8Ω/km							450	7.1	23.4
							24.9Ω/km										900	10.3	33.8
																	1500	13.7	44.8
																	1800	15.2	49.7
																	2000	16.1	52.8
																	2500	18.3	60.1
																	3000	20.5	67.3
																	4500	26.5	86.8
																	5800	31.2	102.4
																	6000	32.0	105.0

Mates with standard RG-58 connectors.*

Suitable for Outdoor and Direct Burial applications.

Gas-injected Foam HDPE Insulation • Black PVC Jacket																			
RF195 80°C	7806R new	NEC:	500	152.4	16.0	7.3	19 AWG	.110	2.79	Duofoil	.195	4.95	50	77%	24.3	79.7	30	2.0	6.6
		CMR	1000	304.8	29.0	13.2	(solid)			+ 90% TC								50	2.5
		CEC:					.037"			Braid							150	4.0	13.3
		CMG FT4					BC			4.2Ω/M'							220	4.9	16.1
							7.6Ω/M'			13.8Ω/km							450	7.1	23.4
							24.9Ω/km										900	10.3	33.8
																	1500	13.7	44.8
																	1800	15.2	49.7
																	2000	16.1	52.8
																	2500	18.3	60.1
																	3000	20.5	67.3
																	4500	26.5	86.8
																	5800	31.2	102.4
																	6000	32.0	105.0

Mates with standard RG-58 connectors.*

BC = Bare Copper • DCR = DC Resistance • HDPE = High-density Polyethylene • TC = Tinned Copper

*Please consult Belden's website at www.belden.com for complete listing.

Description	Part No.	UL NEC/ C(UL) CEC Type	Standard Lengths		Standard Unit Weight		Conductor (stranding) Diameter Nom. DCR	Nominal Core OD		Shielding Materials Nom. DCR	Nominal OD		Nom. Imp. (Ω)	Nom. Vel. of Prop.	Nominal Capacitance		Nominal Attenuation		
			Ft.	m	Lbs.	kg		Inch	mm		Inch	mm			pF/Ft.	pF/m	MHz	dB/100 Ft.	dB/100m

RG-58 Type • 17 AWG Solid .044" Bare Copper • Duofoil® + 95% Tinned Copper Braid Shield

Gas-injected Foam HDPE Insulation • Black Polyethylene Jacket

RF200 80°C	7807A new		500	152.4	15.0	6.8	17 AWG (solid) .044" BC 3.3Ω/M' 10.9Ω/km	.116	2.95	Duofoil + 95% TC Braid 4.2Ω/M' 13.8Ω/km	.195	4.95	50	85%	23.5	77.1	30	1.6	5.4																							
			1000	304.8	27.0	12.3											50	2.1	7.0	150	3.7	12.1	220	4.5	14.6	450	6.5	21.2	900	9.2	30.1	1500	12.0	39.2	1800	13.2	43.2	2000	14.0	45.8	2500	15.7



100% Sweep tested. 6 GHz.
Max. VSWR 1.25:1.

Mates with standard Land Mobile Radio type connectors.*
Suitable for Outdoor and Direct Burial applications.

Gas-injected Foam HDPE Insulation • Black PVC Jacket

RF200 80°C	7807R new	NEC:	500	152.4	15.5	7.0	17 AWG (solid) .044" BC 3.3Ω/M' 10.9Ω/km	.116	2.95	Duofoil + 95% TC Braid 4.2Ω/M' 13.8Ω/km	.195	4.95	50	85%	23.5	77.1	30	1.6	5.4																								
		CMR	1000	304.8	29.0	13.2											50	2.1	7.0	150	3.7	12.1	220	4.5	14.6	450	6.5	21.2	900	9.2	30.1	1500	12.0	39.2	1800	13.2	43.2	2000	14.0	45.8	2500	15.7	51.6



100% Sweep tested. 6 GHz.
Max. VSWR 1.25:1.

Mates with standard Land Mobile Radio type connectors.*

RG-8X Type • 15 AWG Solid .057" Bare Copper • Duobond® II + 95% Tinned Copper Braid Shield

Gas-injected Foam HDPE Insulation • Black Polyethylene Jacket

RF240 80°C	7808A new		500	152.4	20.0	9.1	15 AWG (solid) .057" BC 3.2Ω/M' 10.5Ω/km	.150	3.81	Duobond II + 95% TC Braid 3.5Ω/M' 11.5Ω/km	.240	6.10	50	86%	23.0	75.5	30	1.3	4.1																							
			1000	304.8	39.0	17.7											50	1.6	5.3	150	2.8	9.3	220	3.4	11.1	450	4.9	16.1	900	7.0	22.9	1500	9.1	30.0	1800	10.1	33.2	2000	10.7	35.0	2500	12.0



100% Sweep tested. 6 GHz.
Max. VSWR 1.25:1.

Mates with standard RG-8X connectors.*
Suitable for Outdoor and Direct Burial applications.

Gas-injected Foam HDPE Insulation • Black PVC Jacket

RF240 80°C	7808R new	NEC:	500	152.4	22.0	10.0	15 AWG (solid) .057" BC 3.2Ω/M' 10.5Ω/km	.150	3.81	Duobond II + 95% TC Braid 3.5Ω/M' 11.5Ω/km	.240	6.10	50	86%	23.0	75.5	(Same as 7808A above)																										
		CMR	1000	304.8	44.0	20.0											50	1.6	5.3	150	2.8	9.3	220	3.4	11.1	450	4.9	16.1	900	7.0	22.9	1500	9.1	30.0	1800	10.1	33.2	2000	10.7	35.0	2500	12.0	39.5



100% Sweep tested. 6 GHz.
Max. VSWR 1.25:1.

Mates with standard RG-8X connectors.*

Gas-injected Foam HDPE Insulation • Flooded Water-resistant Black Polyethylene Jacket

RF240 80°C	7808WB new		500	152.4	20.0	9.1	15 AWG (solid) .057" BC 7.6Ω/M' 24.9Ω/km	.150	3.81	Duobond II + 95% TC Braid 4.2Ω/M' 13.8Ω/km	.240	6.10	50	86%	23.0	75.5	(Same as 7808A above)																									
			1000	304.8	39.0	17.7											50	1.6	5.3	150	2.8	9.3	220	3.4	11.1	450	4.9	16.1	900	7.0	22.9	1500	9.1	30.0	1800	10.1	33.2	2000	10.7	35.0	2500	12.0



100% Sweep tested. 6 GHz.
Max. VSWR 1.25:1.

Mates with standard RG-8X connectors.*
Suitable for Outdoor and Direct Burial applications.

BC = Bare Copper • DCR = DC Resistance • HDPE = High-density Polyethylene • TC = Tinned Copper


*Please consult Belden's website at www.belden.com for complete listing.



Description	Part No.	UL NEC/ C(UL) CEC Type	Standard Lengths		Standard Unit Weight		Conductor (stranding) Diameter Nom. DCR	Nominal Core OD		Shielding Materials Nom. DCR	Nominal OD		Nom. Imp. (Ω)	Nom. Vel. of Prop.	Nominal Capacitance		Nominal Attenuation		
			Ft.	m	Lbs.	kg		Inch	mm		Inch	mm			pF/Ft.	pF/m	MHz	dB/ 100 Ft.	dB/ 100m

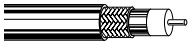
Intermediate Type • 13 AWG Solid .072" Bare Copper • Duobond® II + 95% Tinned Copper Braid Shield

Gas-injected Foam HDPE Insulation • Black Polyethylene Jacket

RF300 80°C	7809A new		500	152.4	30.5	13.9	13 AWG (solid) .072" BC 2.0Ω/M' 6.6Ω/km	.190	4.83	Duobond II + 95% TC Braid 2.7Ω/M' 8.8Ω/km	.300	7.62	50	86%	23.0	75.5	30	1.0	3.4
		1000	304.8	59.0	26.8	50											1.3	4.2	
																	150	2.2	7.3
																	220	2.7	8.9
																	450	3.9	12.9
																	900	5.6	18.3
																	1500	7.3	24.0
																	1800	8.1	26.5
																	2000	8.6	28.2
																	2500	9.7	31.9
																	3000	10.8	35.4
																	4500	13.5	44.4
5800	15.8	51.8																	
6000	16.0	52.6																	


Mates with Land Mobile Radio type connectors.*
Suitable for Outdoor and Direct Burial applications.

Gas-injected Foam HDPE Insulation • Black PVC Jacket

RF300 80°C	7809R	NEC:	500	152.4	34.0	15.5	13 AWG (solid) .072" BC 2.0Ω/M' 6.6Ω/km	.190	4.83	Duobond II + 95% TC Braid 2.7Ω/M' 8.8Ω/km	.300	7.62	50	86%	23.0	75.5	(Same as 7809A above)		
		CMR	1000	304.8	65.0	29.5											50	1.5	4.9
																	100% Sweep tested. 6 GHz. Max. VSWR 1.25:1.		

Mates with Land Mobile Radio type connectors.*


Gas-injected Foam HDPE Insulation • Flooded Water-resistant Black Polyethylene Jacket

RF300 80°C	7809WB new		500	152.4	30.5	13.9	13 AWG (solid) .072" BC 2.0Ω/M' 6.6Ω/km	.190	4.83	Duobond II + 95% TC Braid 2.7Ω/M' 8.8Ω/km	.300	7.62	50	86%	23.0	75.5	(Same as 7809A above)		
		1000	304.8	59.0	26.8	50											1.5	4.9	
																	100% Sweep tested. 6 GHz. Max. VSWR 1.25:1.		

Mates with Land Mobile Radio type connectors.*
Suitable for Outdoor and Direct Burial applications.


RG-8 Type • 10 AWG Solid .108" Bare Copper-covered Aluminum • Duobond II + 95% Tinned Copper Braid Shield

Gas-injected Foam HDPE Insulation • Black Polyethylene Jacket

RF400 80°C	7810A new		500	152.4	42.5	19.3	10 AWG (solid) .108" CCA 1.3Ω/M' 4.4Ω/km	.285	7.24	Duobond II + 95% TC Braid 1.8Ω/M' 5.8Ω/km	.405	10.29	50	86%	23.0	75.5	30	.7	2.1
		1000	304.8	86.0	39.1	50											.9	2.8	
																	150	1.5	4.9
																	220	1.8	6.0
																	450	2.7	8.8
																	900	3.8	12.6
																	1500	5.1	16.6
																	1800	5.6	18.5
																	2000	6.0	19.6
																	2500	6.7	22.0
																	3000	7.5	24.4
																	4500	9.5	31.1
5800	11.1	36.4																	
6000	11.4	37.3																	


Mates with 9913 and Land Mobile Radio type connectors.*
Suitable for Outdoor and Direct Burial applications.

Gas-injected Foam HDPE Insulation • Black PVC Jacket

RF400 80°C	7810R* new	NEC:	500	152.4	48.5	22.0	10 AWG (solid) .108" CCA 1.3Ω/M' 4.4Ω/km	.285	7.24	Duobond II + 95% TC Braid 1.8Ω/M' 5.8Ω/km	.405	10.29	50	86%	23.0	75.5	(Same as 7810A above)		
		CMR	1000	304.8	98.0	44.5											50	1.5	4.9
																	100% Sweep tested. 6 GHz. Max. VSWR 1.25:1.		

Mates with 9913 and Land Mobile Radio type connectors.*

Gas-injected Foam HDPE Insulation • Flooded Water-resistant Black Polyethylene Jacket

RF400 80°C	7810WB new		500	152.4	42.5	19.3	10 AWG (solid) .108" CCA 1.3Ω/M' 4.4Ω/km	.285	7.24	Duobond II + 95% TC Braid 1.8Ω/M' 5.8Ω/km	.405	10.29	50	86%	23.0	75.5	(Same as 7810A above)		
		1000	304.8	86.0	39.1	50											1.5	4.9	
																	100% Sweep tested. 6 GHz. Max. VSWR 1.25:1.		

Mates with 9913 and Land Mobile Radio type connectors.*
Suitable for Outdoor and Direct Burial applications.

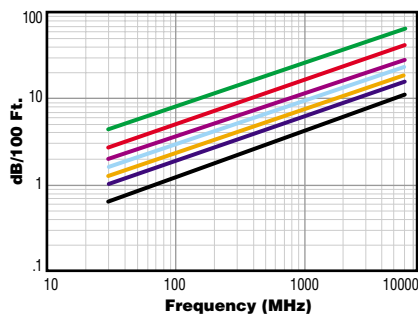
BC = Bare Copper • CCA = Copper-covered Aluminum • DCR = DC Resistance • HDPE = High-density Polyethylene • TC = Tinned Copper

*Please consult Belden's website at www.belden.com for complete listing.



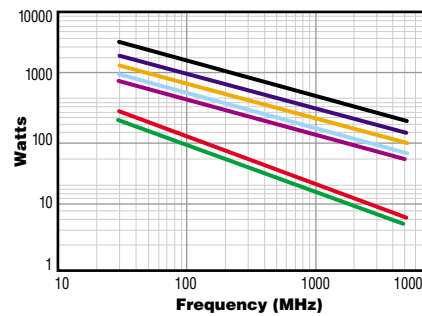
Electrical Characteristics

Attenuation

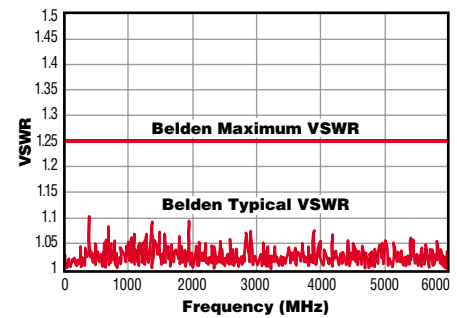


— RF100A — RF100LL — RF195 — RF200 — RF240 — RF300 — RF400

Power Rating



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.

Phase Stability

Phase Attribute	Typical Range (0.45 GHz to 6.0 GHz)	
	ppm/°C	Degree/GHz/m
Temperature (-40°C to +85°C) ¹	±9	±0.6
Bending & Flexing (25 cycles) ²	NA	±1.1

1: Per IEC 60966-1 clause 8.8
2: Per IEC 60966-1 clause 8.6

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

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	HPF195	LMR-195
	RF195	7806R	—	WBC-195R	*	*
	RF200	7807A	—	WBC-200	HPF200	LMR-200
RG-8X	RF200	7807R	—	WBC-200R	*	*
	RF240	7808A	TWB 2401	WBC-240	HPF240	LMR-240
	RF240	7808R	TWB 2401-FR	WBC-240R	*	*
Intermediate	RF240	7808WB	—	—	—	—
	RF300	7809A	—	WBC-300	HPF300	LMR-300
	RF300	7809R	—	WBC-300R	*	*
RG-8	RF300	7809WB	—	—	—	LMR-300-DB
	RF400	7810A	TWB 4001	WBC-400	HPF400	LMR-400
	RF400	7810R	TWB 4001-FR	WBC-400R	*	*
	RF400	7810WB	—	—	—	LMR-400-DB

*Special Construction

For More Information:

www.belden.com

Belden Electronics Division Technical Support 1-800-BELDEN-1 or 1-800-BELDEN-3

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

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