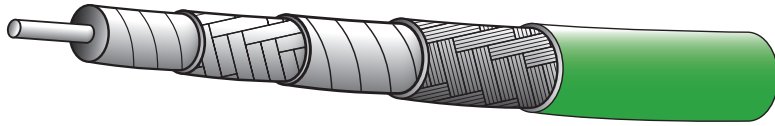


# LL (Low Loss) Coaxial Cable

Lowest attenuation • High frequency designs  
• Expanded PTFE tape dielectrics



## Construction:

Center Conductor: Silver plated copper, solid or stranded  
Dielectric: Expanded PTFE tape  
Inner Braid: Flat silver plated copper strip  
Inter layer: Aluminum polyester or polyimide tape  
Outer Braid: Round silver plated copper  
Jacket: FEP, translucent colors, solid colors or clear

## Physical Characteristics:

Center conductor diameter  
Dielectric diameter  
Diameter over inner braid  
Diameter over interlayer  
Diameter over outer braid  
Overall diameter  
Weight (lbs./MFT)  
Operating temperature range (°C)  
Min. recommended bend radius

## Electrical Characteristics:

Impedance (ohms)  
Capacitance (pF/ft)  
Velocity of propagation

Attenuation (dB/100 ft)  
400 MHz

1 GHz  
2 GHz  
3 GHz  
5 GHz  
10 GHz  
18 GHz

Cut-off frequency (GHz)  
Shielding effectiveness

	LL120	LL142	LL235	LL393-2	LL335	LL450
Center conductor diameter	.0285" Solid	.051" Solid	.057" Solid	.068" (7/.023")	.089" Solid	.133" (7/.048")
Dielectric diameter	.080"	.145"	.160"	.185"	.250"	.360"
Diameter over inner braid	.086"	.152"	.170"	.195"	.258"	.368"
Diameter over interlayer	.092"	.158"	.175"	.200"	.264"	.374"
Diameter over outer braid	.108"	.174"	.191"	.220"	.284"	.394"
Overall diameter	.120"	.195"	.235"	.270"	.335"	.450"
Weight (lbs./MFT)	17	44	48	70	124	180
Operating temperature range (°C)	-55 +200	-55 +200	-55 +200	-55 +200	-55 +200	-55 +200
Min. recommended bend radius	0.6"	1.0"	1.2"	1.4"	1.7"	2.25"
Impedance (ohms)	50	50	50	50	50	50
Capacitance (pF/ft)	25.0	25.0	25.0	25.0	25.0	25.0
Velocity of propagation	80	80	80	80	80	80
Attenuation (dB/100 ft)	<b>Typ / Max</b>	<b>Typ / Max</b>	<b>Typ / Max</b>	<b>Typ / Max</b>	<b>Typ / Max</b>	<b>Typ / Max</b>
400 MHz	9.0 / 12.0	5.2 / 6.5	4.6 / 5.0	4.3 / 4.5	2.4 / 3.5	2.1 / 2.3
1 GHz	14.6 / 18.0	8.2 / 10.0	7.4 / 8.0	6.7 / 7.3	4.8 / 5.5	3.5 / 3.7
2 GHz	21.0 / 25.0	11.3 / 14.0	10.6 / 11.4	9.6 / 10.6	6.8 / 7.8	5.1 / 5.6
3 GHz	25.6 / 30.0	14.0 / 17.0	13.1 / 14.0	12.0 / 13.4	8.4 / 9.5	6.3 / 7.1
5 GHz	32.0 / 38.0	18.0 / 21.0	17.2 / 18.0	15.8 / 18.0	10.3 / 12.5	8.4 / 10.0
10 GHz	48.0 / 54.0	25.0 / 30.0	25.0 / 27.0	22.5 / 26.0	17.0 / 19.0	12.4 / 13.3
18 GHz	61.5 / 74.0	36.0 / 40.0	34.1 / 37.0	31.1 / 36.0	22.0 / 26.0	- / -
Cut-off frequency (GHz)	64.0	32.9	23.0	24.0	18.0	12.8
Shielding effectiveness	< -95 dB	< -95 dB	< -95 dB	< -95 dB	< -95 dB	< -95 dB

All figures referenced above are nominal unless otherwise specified.

# LL (Low Loss) Coaxial Cable

## Unique cable design

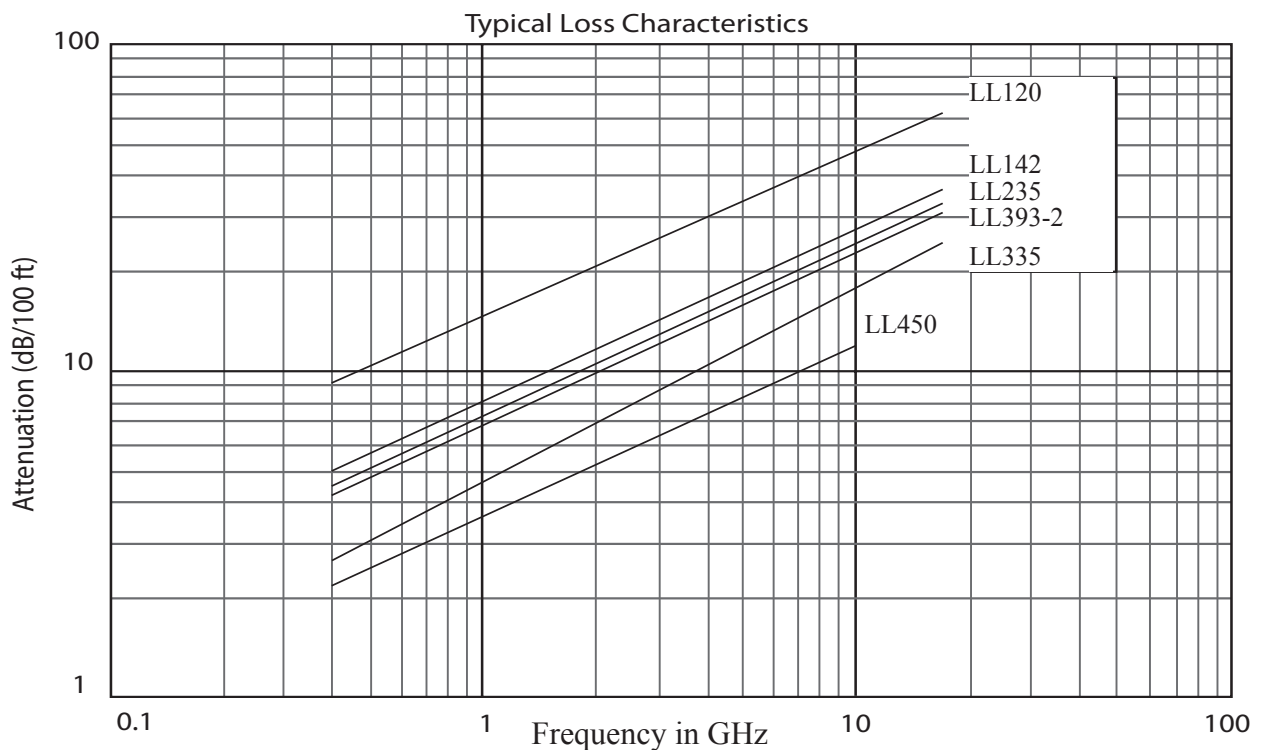
The braid configuration and the expanded PTFE dielectrics of the LL cable constructions contribute to lower attenuation levels at higher frequencies, while providing shielding effectiveness levels that exceed those of flexible MIL-C-17 cables. Flat strips of silver plated copper are braided over the dielectric core with an intermediate metallized polyester or polyimide layer, and an outer round wire braid.

## Improved electrical characteristics

Harbour's LL cables with expanded PTFE dielectrics exhibit low coefficients of expansion over the entire operating temperature range from  $-55^{\circ}\text{C}$  to  $+200^{\circ}\text{C}$ . Impedance discontinuities are minimized at the cable-to-connector interface. Higher levels of power can be transmitted because higher temperatures do not affect the cable due to the thermal stability of the tape. Where phase versus temperature requirements are critical, Harbour's LL cables allow for an approximately 75% lower phase shift and change in propagation time delay due to temperature. Temperature cycling tests have been performed on a number of Harbour's cables with positive results.

## Lowest attenuation for any given size

Harbour's LL coaxial cables, with expanded PTFE dielectrics and strip braid composite configurations, offer attenuation from 20 to 35% below other mil spec cables of comparable size. When size and weight are considerations, Harbour's LL cables should be considered. The graph below defines maximum attenuation levels for all LL cables referenced on the next page.



## Technical support available

Harbour continually works with cable assembly houses and connector manufacturers to ensure maximum system reliability. Cable designs take into consideration size and weight constraints, existing connector availability and termination techniques. Sources of supply for connectors operative to 18 GHz may be recommended.

## Many special constructions available

The chart on the following page outlines just a few designs Harbour has manufactured. Some of the more popular constructions are standard stock items, and many additional cables are available for prototype assemblies. Additional cables, not referenced here, are available to meet specific customer requirements.