LL (Low Loss) Coaxial Cable

-stranded center conductors

Construction:
Center Conductor: Stranded silver plated copper
Dielectric: Expanded PTFE tape
Inner Braid: Flat silver plated copper strip
Interlayer: Aluminum polyester or polyimide tape
Outer Braid: Round silver plated copper
Jacket: FEP, translucent colors, solid colors or clear

Operating temperature -55 +200° C
Velocity of Propagation 80%-83%
Impedance 50 Ohms
Capacitance 25.0 pF/ft
Shielding Effectiveness <-95 dB

	LL142STR	LL270STR	LL450STR	LL480STR
Center conductor diameter	.051″ (7/.017")	.068" (7/.023")	.133″ (7/.048")	.160" (7/.054")
Dielectric diameter	.138″	.185″	.360″	.420"
Diameter over inner braid	.146″	.195″	.368″	.432"
Diameter over interlayer	.152″	.200″	.374″	--
Diameter over outer braid	.168″	.220″	.394″	.452"
Overall diameter	.195″	.270″	.450″	.480"
Weight(lbs/mft)	42	70	175	184
Bend radius	1.0″	1.4″	2.5″	2.75"
Attenuation (dB/100ft) @	**Typ**	**Typ**	**Typ**	**Typ**
400 MHz	6.0	4.2	2.3	1.9
1 GHz	9.5	6.6	3.7	3.1
2 GHz	13.5	9.5	5.3	4.5
3 GHz	16.6	11.7	6.6	5.6
5 GHz	21.7	15.2	8.7	7.5
10 GHz	31.2	22.0	12.8	11.2
18 GHz	42.7	30.1	-	-

See HF Low Loss Coax product pages for LL160-40GHz and LL142-26GHz cables with guaranteed attenuation and VSWR performance at frequencies above 18GHz.

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Flexibility with stranded center conductors
Harbour's Low Loss coax designs with stranded center conductors are more flexible than similar designs with solid center conductors. Low loss cables with stranded center conductors exhibit attenuation slightly higher than comparable solid center conductor designs; however, unique composite braid configurations and expanded PTFE dielectrics result in attenuation lower than MIL-DTL-17 cables of comparable size. Shielding effectiveness levels also exceed those of flexible MIL-DTL-17 constructions.

Excellent electrical characteristics
All of Harbour's LL cables with expanded PTFE dielectrics exhibit low coefficients of expansion over the entire operating temperature range from -55° C to +200° 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.

Attenuation Calculation and K Factors
Although typical and maximum attenuation values are given for discrete frequencies, typical attenuation values may be calculated by using K1 and K2 factors for each construction. The K1 factor is calculated by taking into consideration the type, strand factor, and diameter of the center conductor, and the impedance of the cable. The K2 factor is calculated by taking into consideration the velocity of propagation and the dissipation factor of the dielectric.

Formula for Calculating Attenuation using K Factors:

Attenuation (dB/100 ft) at any frequency (**MHz**) =
$(K1 \times \sqrt{\text{frequency}}) + (K2 \times \text{frequency})$

	LL142STR	LL270STR	LL450STR	LL480STR
K1	.294	.204	.112	.091
K2	.0001785	.000143	.00016	.00021