# SECONDARY CONSTANTS OF NONLOADED CABLE
## 26 GAUGE BST

at 68° F. *

| Freq. kHz | Characteristic Impedance | | | |
| --- | --- | --- | --- | --- |
| | R Ohms | X Ohms (neg.) | Z Ohms | Angle Degrees (neg.) |
| .1 | 2106 | 2098 | 2973 | 44.9 |
| .2 | 1491 | 1484 | 2103 | 44.9 |
| .3 | 1218 | 1211 | 1718 | 44.8 |
| .5 | 945 | 937 | 1331 | 44.7 |
| 1 | 671 | 660 | 942 | 44.5 |
| 2 | 478 | 464 | 666 | 44.1 |
| 3 | 394 | 376 | 544 | 43.7 |
| 5 | 310 | 287 | 422 | 42.9 |
| 8 | 250 | 222 | 335 | 41.6 |
| 10 | 227 | 196 | 300 | 40.8 |
| 15 | 192 | 155 | 247 | 38.8 |
| 20 | 172 | 130 | 216 | 36.9 |

Through Carrier Frequencies — at 55° F. *

| Freq. kHz | Characteristic Impedance | | | |
| --- | --- | --- | --- | --- |
| | R Ohms | X Ohms (neg.) | Z Ohms | Angle Degrees (neg.) |
| .1 | 2081 | 2073 | 2937 | 44.9 |
| .2 | 1473 | 1466 | 2078 | 44.9 |
| .5 | 934 | 926 | 1315 | 44.7 |
| 1 | 664 | 652 | 931 | 44.5 |
| 2 | 473 | 458 | 659 | 44.1 |
| 5 | 306 | 283 | 417 | 42.8 |
| 10 | 225 | 193 | 297 | 40.7 |
| 15 | 191 | 152 | 244 | 38.6 |
| 20 | 171 | 127 | 213 | 36.7 |
| 50 | 131 | 67 | 147 | 27.1 |
| 100 | 118 | 39 | 124 | 18.1 |
| 200 | 112 | 22 | 114 | 11.4 |
| 250 | 110 | 19 | 112 | 9.9 |
| 500 | 106 | 13 | 107 | 6.7 |
| 1000 | 103 | 8 | 104 | 4.7 |
| 2000 | 101 | 6 | 101 | 3.2 |
| 4000 | 99 | 4 | 99 | 2.1 |
| 5000 | 98 | 3 | 98 | 1.8 |
| 10000 | 97 | 2 | 97 | 1.3 |

* For temperature variations see page 3.

at 68° F. *

| Freq. kHz | Propagation Constant per mile | | | Phase Delay Sec./Mile (x 10⁻⁶) | Velocity of Propagation Miles/Sec. (x 10³) |
|---|---|---|---|---|---|
| | Attenuation | | Phase Shift $\beta$ radians | | |
| | $\alpha$ nepers | dB | | | |
| .1 | .105 | .91 | .105 | 166.48 | 6.0 |
| .2 | .148 | 1.28 | .148 | 117.77 | 8.5 |
| .3 | .181 | 1.57 | .181 | 96.24 | 10.4 |
| .5 | .233 | 2.03 | .234 | 74.61 | 13.4 |
| 1 | .329 | 2.85 | .333 | 52.92 | 18.9 |
| 2 | .461 | 4.01 | .473 | 37.65 | 26.6 |
| 3 | .561 | 4.87 | .683 | 30.94 | 32.3 |
| 5 | .714 | 6.20 | .763 | 24.29 | 41.2 |
| 8 | .885 | 7.68 | .985 | 19.60 | 51.0 |
| 10 | .976 | 8.47 | 1.117 | 17.77 | 56.3 |
| 15 | 1.155 | 10.03 | 1.415 | 15.02 | 66.6 |
| 20 | 1.291 | 11.22 | 1.691 | 13.45 | 74.3 |

Through Carrier Frequencies — at 55° F. *

| Freq. kHz | Propagation Constant per mile | | | Phase Delay Sec./Mile (x 10⁻⁶) | Velocity of Propagation Miles/Sec. (x 10³) |
|---|---|---|---|---|---|
| | Attenuation | | Phase Shift $\beta$ radians | | |
| | $\alpha$ nepers | dB | | | |
| .1 | .103 | .89 | .103 | 163.77 | 6.1 |
| .2 | .145 | 1.26 | .146 | 115.86 | 8.6 |
| .5 | .229 | 1.99 | .231 | 73.37 | 13.6 |
| 1 | .323 | 2.81 | .327 | 52.03 | 19.2 |
| 2 | .453 | 3.94 | .465 | 37.02 | 27.0 |
| 5 | .702 | 6.09 | .751 | 23.91 | 41.8 |
| 10 | .958 | 8.32 | 1.100 | 17.51 | 57.1 |
| 15 | 1.134 | 9.85 | 1.396 | 14.81 | 67.5 |
| 20 | 1.266 | 11.0 | 1.669 | 13.28 | 75.3 |
| 50 | 1.680 | 14.6 | 3.198 | 10.18 | 98.2 |
| 100 | 1.968 | 17.1 | 5.756 | 9.16 | 109.2 |
| 200 | 2.373 | 20.6 | 10.90 | 8.68 | 115.3 |
| 250 | 2.587 | 22.5 | 13.45 | 8.56 | 116.8 |
| 500 | 3.564 | 31.0 | 25.94 | 8.26 | 121.1 |
| 1000 | 5.162 | 44.8 | 50.39 | 8.02 | 124.7 |
| 2000 | 7.540 | 65.5 | 98.42 | 7.83 | 127.7 |
| 4000 | 10.95 | 95.1 | 193.1 | 7.68 | 130.1 |
| 5000 | 12.47 | 108.3 | 240.1 | 7.64 | 130.8 |
| 10000 | 18.73 | 162.7 | 472.7 | 7.52 | 132.9 |

Notes: dB = 8.686 $\alpha$

phase delay = $\beta/2\pi f$

velocity of propagation = $2\pi f/\beta$

Estimated Average Temperature Variation *

| Freq. kHz | per mile per degree F. | | | |
|---|---|---|---|---|
| | dB | Phase Radians | R Ohms | X Ohms |
| .3 | .0020 | .00023 | 1.083 | -1.119 |
| .5 | .0026 | .00030 | .838 | - .864 |
| 1 | .0036 | .00042 | .595 | - .619 |
| 2 | .0051 | .00059 | .410 | - .438 |
| 3 | .0063 | .00072 | .331 | - .364 |
| 5 | .0081 | .00092 | .255 | - .291 |
| 10 | .0119 | .00126 | .175 | - .208 |
| 15 | .0149 | .00151 | .135 | - .177 |
| 20 | .0173 | .00169 | .109 | - .155 |
| 50 | .0265 | .00228 | .040 | - .072 |
| 100 | .0335 | .00265 | .007 | - .070 |
| 200 | .0373 | ** | ** | ** |
| 250 | .0380 | | | |
| 500 | .0427 | | | |
| 1000 | .0533 | | | |
| 2000 | .0846 | | | |
| 4000 | .1650 | | | |
| 5000 | .2060 | | | |
| 10000 | .4390 | | | |

* Average values between 34° and 76° F.

** At high frequency, inductance has a significant effect on phase shift and impedance; therefore, due to the uncertainty of the effect of temperature variation on inductance, the phase and impedance variations above 100 kHz are not given.