

3M™ Cable

Cable Properties — Internal Wiring

| | | Internal Wiring | | | | | |
|---------------------------|--|--|---|---|---|---|---|
| | | Round Conductor Flat Cable | | | | | |
| | | 3447 Series | 3749 Series | 3754 Series | 2049 Series | 3604 Series | 3756 Series |
| Typical Cable Properties | 3447 Series | 3749 Series | 3754 Series | 2049 Series | 3604 Series | 3756 Series | |
| 1 | Jacket Material | — | — | — | — | — | — |
| 2 | Jacket Color | — | — | — | — | — | — |
| 3 | Shield | — | — | — | — | — | — |
| 4 | Primary Insulation Material | PVC | TPE | PVC | PO | FEP | TPE |
| 5 | Primary Color | Gray | Gray | Gray | Off-White | Opaque White | Gray |
| 6 | First Conductor Marking | Red | Blue | Red | Blue | Blue | Blue |
| 7 | Conductor Spacing inch (mm) | .025 (0.64) | .025 (0.64) | .025 (0.64) | .025 (0.64) | .025 (0.64) | .025 (0.64) |
| 8 | Conductor Size | 30 AWG | 30 AWG | 30 AWG | 30 AWG | 30 AWG | 30 AWG |
| 9 | Conductor Stranding | Solid (0.254) | Solid (0.254) | 7 × 38 (7 × 0.102) | Solid (0.254) | Solid (0.254) | 7 × 38 (7 × 0.102) |
| 10 | Conductor Material | Copper | Copper | Copper | Copper | Copper | Copper |
| 11 | Conductor Resistance @ 20C Ohms / 1000 ft. [Ohms / km] | 112 | 112 | 101 | 112 | 104 | 101 |
| | | (366) | (366) | (333) | (366) | (341) | (333) |
| 12 | Conductor Quantity (For others, contact your sales representative) | 20, 26, 34,36,40,50, 60, 68, 80, 100 | 20, 26, 34, 36, 40, 50, 60, 68, 80, 100 | 20, 26, 34, 36, 40, 50, 60, 68, 80, 100 | 20, 26, 34, 36, 40, 50, 60, 68, 80, 100 | 20, 26, 36, 40, 50, 60, 68, 80, 100 | 20, 26, 34, 36, 40, 50, 60, 68, 80, 100 |
| 13 | Impedance (Ohms) Unbalanced Balanced | 81 | 90 | 73 | 83 | 99 | 82 |
| | | 136 | — | 122 | 137 | 165 | 138 |
| 14 | Capacitance pF / ft [pF / m] Unbalanced Balanced | 19.1 (62.7) | 16.5 (54.1) | 20.8 (68.2) | 19.0 (62.3) | 13.8 (45.3) | 17.3 (56.8) |
| | | 11.0 (36.1) | — | 12.0 (39.4) | 11.1 (36.4) | 8.2 (26.9) | 10.0 (32.8) |
| 15 | Inductance μH / ft [μH / m] Unbalanced Balanced | .13 (0.43) | .13 (0.43) | .11 (0.36) | .13 (0.43) | .14 (0.46) | .12 (0.39) |
| | | .20 (0.66) | — | .18 (0.59) | .21 (0.69) | .23 (0.75) | .19 (0.62) |
| 16 | Signal Speed | | | | | | |
| | Propagation Delay | | | | | | |
| | ns / ft. [ns / m] Unbalanced | 1.55 (5.09) | 1.48 (4.86) | 1.51 (4.95) | 1.58 (5.18) | 1.38 (4.53) | 1.42 (4.66) |
| | Balanced | 1.49 (4.89) | — | 1.45 (4.76) | 1.52 (4.99) | 1.36 (4.46) | 1.38 (4.53) |
| Velocity of Propagation % | Unbalanced | 66 | 69 | 67 | 64 | 74 | 72 |
| | Balanced | 68 | — | 70 | 67 | 75 | 74 |
| 17 | Insulation Resistance Ohms / 10 ft. [3 m] | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ |
| 18 | Voltage Rating | | | | | | |
| | US | 30 | 150 | 30 | 30 | 150 | 150 |
| | Canada | 30 | 150 | 30 | — | — | 150 |
| | Europe | <50 | <50 | <50 | <50 | <50 | <50 |
| 19 | Temperature Rating US | -20C to +105C | -40C to +105C | -20C to +105C | -40C to +105C | -55C to +150C | -40C to +105C |
| | Canada | -20C to +105C | -40C to +105C | -20C to +105C | -40C to +105C | — | -40C to +105C |
| 20 | UL Listing - US | AWM | AWM | AWM | AWM | AWM | AWM |
| | | Style 20596 | Style 20297 | Style 20596 | Style 20930 | Style 20726 | Style 20297 |
| 21 | UL Listing - Canada | Optional | Optional | Optional | | | Optional |
| | | IA | IA | IA | — | — | IA |
| | | 105C 30V FT1 | 105C 150V FT1 | 105C 30V FT1 | | | 105C 150V FT1 |
| 22 | Catalog Tech Sheets | TS-0830 | TS-0068 | TS-0875 | TS-0886 | TS-0653 | TS-0508 |

3M™ Cable

Cable Properties - Internal Wiring

| Internal Wiring | | | | | | | | | | |
|----------------------------|---|----------------------------|---|--|---|---|--|--|--|--------------------|
| Round Conductor Flat Cable | | | | | | | | | | |
| | 3609 Series | 3849 Series | 3625 Series | 3709 Series | 3365 Series | 3667 Series | 3355 Series | 2010 Series | 3601 Series | |
| 1 | — | — | — | — | — | — | — | — | — | |
| 2 | — | — | — | — | — | — | — | — | — | |
| 3 | — | — | — | — | — | — | — | — | — | |
| 4 | FEP | PVC | PVC | PVC | PVC | PVC | TPE | PO | FEP | |
| 5 | Opaque White | Gray | Gray | Gray | Gray/Black | Gray | Gray | Off-white | Opaque White | |
| 6 | Blue | Red | Red | Red | Red | Red | Blue | Blue | Blue | |
| 7 | .025 (0.64) | .033 (0.85) | 1.0mm (.039 in.) | .050 (1.27) | .050 (1.27) | .050 (1.27) | .050 (1.27) | .050 (1.27) | .050 (1.27) | |
| 8 | 30 AWG | 30 AWG | 28 AWG | 28 AWG | 28 AWG | 28 AWG | 28 AWG | 28 AWG | 28 AWG | |
| 9 | 7 × 38 (7 × 0.102) | 7 X 38 (7 × 0.102) | 7 × 36 (7 × 0.127) | Solid (0.32) | 7 × 36 (7 × 0.127) | 7 × 36 (7 × 0.127) | 7 × 36 (7 × 0.127) | 7 × 36 (7 × 0.127) | 7 × 36 (7 × 0.127) | |
| 10 | Copper | Copper | Copper | Copper | Copper | Copper | Copper | Copper | Copper | |
| 11 | 94 (310) | 101 (333) | 65 (213) | 69 (228) | 65 (213) | 65 (213) | 65 (213) | 65 (213) | 60 (198) | |
| | 20, 26, 36, 40, 50, 60, 68, 80, 100 | 96 | 06, 08, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50 | 09, 10, 14, 15, 16, 18, 20, 24, 25, 26, 30, 34, 36, 37, 40, 50, 60, 64 | 06, 08, 09, 10, 12, 14, 15, 16, 20, 24, 25, 26, 30, 34, 36, 37, 40, 44, 50, 60, 64 | 10, 14, 16, 20, 24, 25, 26, 30, 34, 36, 37, 40, 44, 50, 60, 64 | 09, 10, 14, 15, 16, 18, 20, 24, 25, 26, 30, 34, 36, 37, 40, 50, 60, 64 | 09, 10, 14, 15, 16, 18, 20, 24, 25, 26, 30, 34, 36, 37, 40, 50, 60, 64 | 10, 15, 20, 25, 26, 34, 40, 50, 60 | |
| 13 | 91 — | 89 144 | 92 146 | 114 188 | 108 — | 112 — | 117 — | 107 176 | 131 — | |
| | 14.7 (48.2) — | 17.5 (57.4) 10.5 (34.5) | 54.5 (16.6) 32.2 (9.8) | 12.8 (42.0) 7.4 (24.3) | 12.8 (42.0) — | 12.7 (41.5) — | 11.7 (38.4) — | 14.0 (45.93) 8.2 (26.95) | 9.9 (32.5) — | |
| 15 | .12 (0.39) — | .14 (0.46) .22 (0.72) | 0.46 (.14) 0.69 (.21) | .17 (0.56) .26 (0.85) | .15 (0.50) — | .16 (0.52) — | .16 (0.52) — | .16 (0.53) .25 (0.84) | .17 (0.56) — | |
| | 16 | 1.34 (4.40) — | 1.56 (5.12) 1.51 (4.95) | 4.86 (1.48) 4.69 (1.43) | 1.45 (4.76) 1.40 (4.59) | 1.40 (4.59) — | 1.42 (4.66) — | 1.37 (4.49) — | 1.50 (4.92) 1.45 (4.76) | 1.29 (4.23) — |
| 76 — | | 65 67 | 69 71 | 70 73 | 73 — | 72 — | 74 — | 68 70 | 79 — | |
| 17 | | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ | |
| 18 | | 150 — <50 | 300 300 <50 | 300 300 <50 | 300 300 <50 | 300 300 <50 | 300 300 <50 | 300 — <50 | 30 — <50 | 300 — <50 |
| | 19 | -55C to +150C — | -20C to +105C -20C to +105C | -20C to +105C -20C to +105C | -20C to +105C -20C to +105C | -20C to +105C -20C to +105C | -20C to +105C -20C to +105C | -40C to +105C — | -40C to +105C — | -55C to +200C — |
| | | 20 | AWM Style 20726 | AWM Style 2651 | AWM 2651 | AWM Style 2651 | AWM Style 2651 | AWM Style 2651 | AWM Style 20297 | AWM Style 20930 |
| 21 | — | Optional IA | Optional IA | Optional IA | Optional IA | Optional IA | — | — | — | |
| | | 105C 300V FT1 | 105C 300V FT1 | 105C 300V FT1 | 105C 300V FT1 | 105C 300V FT1 | | | | |
| 22 | TS-0654 | TS-0573 | TS-0452 | TS-0419 | TS-0080 | TS-0247 | TS-0317 | TS-0722 | TS-0553 | |

3M™ Cable

Cable Properties — Internal Wiring

| Typical Cable Properties | | Internal Wiring | | | | | |
|--------------------------|--|--|--|--|--|-------------------------|---------------------------|
| | | Round Conductor Flat Cable | | | | | |
| | | 3306 Series | 3801 Series | 3770 Series | 8125 Series | 8124 Series | 8132 Series |
| 1 | Jacket Material | — | — | — | — | — | — |
| 2 | Jacket Color | — | — | — | — | — | — |
| 3 | Shield | — | — | — | — | — | — |
| 4 | Primary Insulation Material | PVC | PVC | TPE | PVC | PVC | PVC |
| 5 | Primary Color | Gray | Gray/Black | Gray | Dark Gray | Dark Gray | Dark Gray |
| 6 | First Conductor Marking | Red | Red | Blue | Red | Red | Red |
| 7 | Conductor Spacing inch (mm) | .050 (1.27) | .050 (1.27) | .050 (1.27) | .100 (2.54) | .100 (2.54) | .156 (3.96) |
| 8 | Conductor Size | 26 AWG | 26 AWG | 26 AWG | 24 AWG | 22 AWG | 18 AWG |
| 9 | Conductor Stranding | Solid (0.404) | 7 × 34 (7 × 0.160) | 7 × 34 (7 × 0.160) | 7 × 32 (7 × 0.203) | 7 × 30 (7 × 0.254) | 19 × 30 (19 × 0.254) |
| 10 | Conductor Material | Copper | Copper | Copper | Copper | Copper | Copper |
| 11 | Conductor Resistance @ 20C Ohms / 1000 ft. [Ohms / km] | 41 | 41 | 41 | 25 | 16 | 6 |
| | | (135) | (134) | (134) | (83) | (53) | (20) |
| 12 | Conductor Quantity (For others, contact your sales representative) | 10, 14, 16, 20, 24, 26, 34, 40, 50, 60 | 09, 10, 14, 15, 16, 18, 20, 24, 25, 26, 30, 34, 36, 37, 40, 44, 50, 60, 64 | 09, 10, 14, 15, 16, 20, 24, 25, 26, 30, 34, 36, 37, 40, 50, 60, 64 | 06, 08, 10, 12, 14, 15, 17, 20, 30 | 05 Through 40 | 04 Through 24 |
| 13 | Impedance (Ohms) Unbalanced Balanced | 103 | 89 | 104 | 136 | 119 | 127 |
| | | 171 | — | — | — | — | — |
| 14 | Capacitance pF / ft [pF / m] Unbalanced Balanced | 13.6 (44.62) | 16.2 (53.1) | 13.1 (42.98) | 9.6 (31.5) | 11.0 (36.1) | 9.6 (31.5) |
| | | 7.9 (25.91) | — | — | — | — | — |
| 15 | Inductance μH / ft [μH / m] Unbalanced Balanced | .15 (0.49) | .13 (0.43) | .14 (0.46) | .18 (0.59) | .15 (0.49) | .15 (0.49) |
| | | .23 (0.75) | — | — | — | — | — |
| 16 | Signal Speed | | | | | | |
| | Propagation Delay ns / ft [ns / m] Unbalanced | 1.40 (4.59) | 1.44 (4.72) | 1.36 (4.46) | 1.30 (4.27) | 1.30 (4.27) | 1.22 (4.00) |
| | Balanced | 1.35 (4.43) | — | — | — | — | — |
| | Velocity of Propagation % Unbalanced | 73 | 71 | 75 | 78 | 78 | 83 |
| Balanced | 75 | — | — | — | — | — | |
| 17 | Insulation Resistance Ohms / 10 ft. [3 m] | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ |
| 18 | Voltage Rating | | | | | | |
| | US | 300 | 300 | 300 | 300 | 300 | 300 |
| | Canada | 300 | 300 | — | 150 | 150 | 150 |
| Europe | <50 | <50 | <50 | <50 | <50 | <50 | |
| 19 | Temperature Rating US | -20C to +105C | -20C to +105C | -40C to +105C | -20C to +105C | -20C to +105C | -20C to +105C |
| | Canada | -20C to +105C | -20C to +105C | — | -20C to +80C | -20C to +80C | -20C to +80C |
| 20 | UL Listing - US | AWM | AWM | AWM | AWM | AWM | AWM |
| | | Style 2651 | Style 2651 | Style 20297 | Style 20462 | Style 20462 | Style 20462 |
| 21 | UL Listing - Canada | Optional | Optional | — | Optional | Optional | Optional |
| | | IA | IA | — | IA | IA | IA |
| | | 105C 300V FT1 | 105C 300V FT1 | — | 80C 150V FT1 | 80C 150V FT1 | 80C 150V FT1 |
| 22 | Catalog Tech Sheets | TS-0066 | TS-0063 | TS-0342 | TS-0259 | TS-0084 | TS-0057 |

TS-0731-08
Sheet 3 of 8

3M Cable

Cable Properties - Internal Wiring

| Internal Wiring | | | | | | | | |
|--------------------------|--|--|--|--|--------------------------------|---|---|--|
| Extended Flex Life Cable | | Color Coded Flat Cable | | | Twisted Pair Flat Cable | | | |
| | 3539 Series | 3319 Series | 3302 Series | 3811 Series | 3391 Series | 1700 Series | 2100 Series | 3782 Series |
| 1 | — | — | — | — | — | — | — | — |
| 2 | — | — | — | — | — | — | — | — |
| 3 | — | — | — | — | — | — | — | — |
| 4 | PVC | PVC | PVC | PVC | PVC | PVC | PO | PVC |
| 5 | Gray | Black | Multi | Multi | Multi | Multi | Blue/White | Multi |
| 6 | Red | Red | Brown | Brown | Brown | Brown | Blue | Brown |
| 7 | .050 (1.27) | .050 (1.27) | .050 (1.27) | .050 (1.27) | .156 (3.96) | .050 (1.27) | .050 (1.27) | .050 (1.27) |
| 8 | 28 AWG | 28 AWG | 28 AWG | 26 AWG | 22 AWG | 28 AWG | 28 AWG | 28 AWG |
| 9 | 19 × 40 (19 × 0.079) | 19 × 40 (19 × 0.079) | 7 × 36 (7 × 0.127) | 7 × 34 (7 × 0.160) | 7 × 30 (7 × 0.254) | 7 × 36 (7 × 0.127) | 7 × 36 (7 × 0.127) | 7 × 36 (7 × 0.127) |
| 10 | Copper | Copper Alloy | Copper | Copper | Copper | Copper | Copper | Copper |
| 11 | 62 (204) | 65 (214) | 65 (213) | 41 (134) | 16 (53) | 65 (213) | 65 (213) | 65 (213) |
| | 09, 10, 14, 15, 16, 20, 24, 25, 26, 30, 34, 36, 37, 40, 50, 60, 64 | 09, 10, 14, 15, 16, 20, 24, 25, 26, 30, 34, 36, 37, 40, 50, 60, 64 | 09, 10, 14, 15, 16, 18, 20, 24, 25, 26, 30, 34, 36, 37, 40, 50, 60, 64 | 09, 10, 14, 15, 16, 18, 20, 24, 25, 26, 30, 34, 36, 37, 40, 50, 60, 64 | 04, 06, 08, 10, 12, 15, 18, 22 | 10 (5 pair), 14 (7 pair), 16 (8 pair), 20 (10 pair), 26 (13 pair), 34 (17 pair), 36 (18 pair), 40 (20 pair), 50 (25 pair), 60 (30 pair), 64 (32 pair) | 10 (5 pair), 14 (7 pair), 16 (8 pair), 20 (10 pair), 24 (12 pair), 26 (13 pair), 34 (17 pair), 40 (20 pair), 50 (25 pair), 60 (30 pair), 64 (32 pair) | 10 (5 pair), 14 (7 pair), 16 (8 pair), 20 (10 pair), 26 (13 pair), 34 (17 pair), 40 (20 pair), 50 (25 pair), 60 (30 pair), 64 (32 pair) |
| 13 | 106 — | 107 — | 105 — | 95 — | 153 — | 101 122 | 102 119 | 115 139 |
| | 13.3 (43.8) — | 13.3 (43.6) — | 14.1 (46.3) — | 14.8 (48.6) — | 8.4 (27.5) — | 15.9 (52.2) 13.3 (43.6) | 16.9 (55.4) 14.6 (47.9) | 43.6 (13.3) 36.1 (11.0) |
| 15 | .15 (0.49) — | .15 (0.49) — | .15 (0.49) — | .13 (0.43) — | .20 (0.65) — | .16 (0.52) .20 (0.66) | .18 (0.59) .21 (0.69) | .59 (.18) .69 (.21) |
| | 1.42 (4.66) — | 1.42 (4.66) — | 1.47 (4.82) — | 1.41 (4.63) — | 1.29 (4.22) — | 1.61 (5.28) 1.63 (5.35) | 1.74 (5.71) 1.73 (5.68) | 5.0 (1.53) 5.0 (1.53) |
| 16 | 72 — | 72 — | 69 — | 72 — | 79 — | 63 62 | 58 59 | 66 66 |
| | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ | >1 × 10 ⁹ | >1 × 10 ⁹ | >1 × 10 ⁹ | >1 × 10 ⁹ | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ |
| 18 | 300 300 <50 | 300 300 <50 | 300 150 <50 | 300 150 <50 | 600 150 <50 | 300 150 <50 | 150 — <50 | 300 — <50 |
| | -20C to +105C -20C to +105C | -20C to +105C -20C to +105C | -20C to +105C -20C to +80C | -20C to +105C -20C to +80C | -20C to +80C -20C to +80C | -20C to +105C -20C to +80C | -40C to +80C — | -20C to +80C — |
| | AWM Style 2651 | AWM Style 2651 | AWM Style 20462 | AWM Style 20462 | AWM Style 20122 | AWM Style 20462 | AWM Style 21008 | AWM Style 20488 |
| 21 | Optional IA 105C 300V FT1 | Optional IA 105C 300V FT1 | Optional IA 80C 150V FT1 | Optional IA 80C 150V FT1 | Optional IA 80C 150V FT1 | Optional IA 80C 150V FT1 | — | — |
| | 22 | TS-0058 | TS-0059 | TS-0123 | TS-0122 | TS-0079 | TS-0115 | TS-0762 |

TS-0731-08
Sheet 4 of 8

3M™ Cable

Cable Properties — External Wiring

| | Typical Cable Properties | Internal Wiring | | | External Wiring | | |
|----|---|---|---|---------------------------------|--|--|--|
| | | Ground Plane Cable | | | Round, Jacketed, Discrete, Twisted Pair Cable | | |
| | | 3469 Series | 3476 Series | 3353 Series | 3600X Series | 3647B Series | 3644 Series |
| 1 | Jacket Material | — | — | — | PVC | PVC | PVC |
| 2 | Jacket Color | — | — | — | Beige/Gray/Black | Beige | Beige |
| 3 | Shield | — | — | — | Film Foil & Braid | Film Foil & Braid | Film Foil & Braid |
| 4 | Primary Insulation Material | PVC | PVC | PVC | PVC | PO | PO |
| 5 | Primary Color | Gray | Gray | Gray | Multi | Multi | Multi |
| 6 | First Conductor Marking | Red | Red | Red | N/A | N/A | N/A |
| 7 | Conductor Spacing inch (mm) | .050 (1.27) | .050 (1.27) | .050 (1.27) | N/A | N/A | N/A |
| 8 | Conductor Size | 28 AWG | 28 AWG | 28 AWG | 28 AWG | 28 AWG | 28 AWG |
| 9 | Conductor Stranding | 7 × 36 (7 × 0.127) | 7 × 36 (7 × 0.127) | 7 × 36 (7 × 0.127) | 7 × 36 (7 × 0.127) | 7 × 36 (7 × 0.127) | 7 × 36 (7 × 0.127) |
| 10 | Conductor Material | Copper | Copper | Copper | Copper | Copper | Copper |
| 11 | Conductor Resistance Ohms / 1000 ft. (Ohms / km) @ 20C | 65 (213) | 65 (213) | 65 (213) | 65 (213) | 65 (213) | 65 (213) |
| 12 | Conductor Quantity (For others, contact your sales representative) | 10, 14, 15, 16, 20, 25, 26, 34, 37, 40, 50, 60, 64 | 10, 14, 15, 16, 20, 24, 25, 26, 34, 37, 40, 50, 60, 64 | 26, 34, 40, 50, 60, 64 | 14 (7 pair), 20 (10 pair), 26 (13 pair), 36 (18 pair), 40 (20 pair), 50 (25 pair), 68 (34 pair), 80 (40 pair), 100 (50 pair) | 36 (18 pair) | 14 (7 pair), 16 (8 pair), 20 (10 pair), 26 (13 pair), 36 (18 pair), 40 (20 pair), 50 (25 pair), 68 (34 pair), 80 (40 pair), 100 (50 pair) |
| 13 | Impedance (Ohms) Unbalanced Balanced | 65 — | 65 — | 65 — | 58 91 | 63 100 | 63 100 |
| 14 | Capacitance pF / ft. [pF / m] Unbalanced Balanced | 25.1 (82.3) — | 25.1 (82.3) — | 25.1 (82.3) — | 29.2 (95.8) 18.5 (60.7) | 24.2 (79.4) 15.3 (50.2) | 24.2 (79.4) 15.3 (0.49) |
| 15 | Inductance μH / ft. [μH / m] Unbalanced Balanced | .11 (0.36) — | .11 (0.36) — | .11 (0.36) — | .10 (0.33) .15 (0.49) | .10 (0.33) .15 (0.49) | .10 (0.33) .15 (0.49) |
| 16 | Signal Speed Propagation Delay ns / ft [ns / m] Unbalanced Balanced Velocity of Propagation % Unbalanced Balanced | 1.64 (5.38) -- 62 — | 1.64 (5.38) — 62 — | 1.64 (5.38) — 62 — | 1.69 (5.54) 1.69 (5.54) 60 60 | 1.54 (5.05) 1.54 (5.05) 66 66 | 1.54 (5.05) 1.54 (5.05) 66 66 |
| 17 | Insulation Resistance Ohms / 10 ft. [3 m] | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ |
| 18 | Voltage Rating US Canada Europe | 300 150 <50 | 300 150 <50 | 300 150 <50 | N.E.C. Article 725, CL2 150 <50 | N.E.C. Article 725, CL2 150 <50 | N.E.C. Article 725, CL2 150 <50 |
| 19 | Temperature Rating US Canada | -20C to +105C -20C to +105C | -20C to +105C -20C to +105C | -20C to +105C -20C to +105C | 75C 80C | 75C 80C | 75C 80C |
| 20 | UL Listing - US | AWM Style 2682 | AWM Style 2682 | AWM Style 2682 | CL2 CL2 | CL2 CL2 | CL2 CL2 |
| 21 | UL Listing - Canada | Optional IA 105C 150V FT1 | Optional IA 105C 150V FT1 | Optional IA 105C 150V FT1 | IIA/B IIA/B 80C 150V FT1 | IIA/B IIA/B 80C 150V FT1 | IIA/B IIA/B 80C 150V FT1 |
| 22 | Catalog Tech Sheets | TS-0077 | TS-0071 | TS-0078 | TS-0388 | TS-0582 | TS-0826 |

3M™ Cable

Cable Properties - External Wiring

| | External Wiring | | | | | | |
|----|---|---|--|--|--|--|---|
| | Round, Jacketed, Discrete, Twisted Pair Cable | | Round, Jacketed Mass-Terminated Cable | | Flat Jacketed Cables | | |
| | 3560 Series | 3750 Series | 3759 Series | 3659 Series | 3603 Series | 3517 Series | 1785 Series |
| 1 | PVC | PVC | PVC | PVC | PVC | PVC | PVC |
| 2 | Gray | Gray | Black | Black | Black | Black | Black |
| 3 | Film Foil & Braid | Film Foil & Braid | N/A | Film Foil & Braid | N/A | Expanded Copper | Expanded Copper |
| 4 | PVC | PVC | PVC | PVC | PVC | PVC | PVC |
| 5 | Multi | Multi | Gray | Gray | Gray | Gray | Multi |
| 6 | N/A | N/A | Red | Red | Red | Red | Brown |
| 7 | N/A | N/A | .050 (1.27) | .050 (1.27) | .050 (1.27) | .050 (1.27) | .050 (1.27) |
| 8 | 26 AWG | 26 AWG | 28 AWG | 28 AWG | 28 AWG | 28 AWG | 28 AWG |
| 9 | Solid (0.404) | 7 × 34 (7 × 0.160) | 7 × 36 (7 × 0.127) | 7 × 36 (7 × 0.127) | 7 × 36 (7 × 0.127) | 7 × 36 (7 × 0.127) | 7 × 36 (7 × 0.127) |
| 10 | Copper | Copper | Copper | Copper | Copper | Copper | Copper |
| 11 | 44 (143) | 41 (134) | 65 (213) | 65 (213) | 65 (213) | 65 (213) | 65 (213) |
| | 10 (5 pair), 16 (8 pair), 26 (13 pair), 32 (16 pair), 38 (19 pair), 50 (25 pair), 60 (30 pair), 64 (32 pair) | 10 (5 pair), 16 (8 pair), 26 (13 pair), 38 (19 pair), 50 (25 pair), 64 (32 pair) | 9, 10, 14, 15, 16, 20, 24, 25, 26, 30, 34, 36, 37, 40, 50, 60, 64 | 9, 10, 14, 15, 16, 20, 24, 25, 26, 34, 36, 37, 40, 50, 60, 64 | 10, 16, 20, 25, 26, 34, 36, 37, 40, 50, 60, 64 | 9, 10, 14, 15, 16, 20, 24, 25, 26, 30, 34, 36, 37, 40, 50, 60, 64 | 20 (10 pair), 26 (13 pair), 34 (17 pair), 36 (18 pair), 40 (20 pair), 50 (25 pair), 60 (30 pair), 64 (32 pair) |
| 13 | 59 | 51 | 90 | 62 | 95 | 70 | 67 |
| | 97 | 100 | 133 | 106 | 160 | 119 | 118 |
| 14 | 29.3 (96.1) | 35.6 (116.8) | 16.7 (54.8) | 27.7 (90.9) | 15.5 (50.9) | 21.5 (70.5) | 24.7 (81.0) |
| | 17.8 (58.4) | 18.1 (59.4) | 11.9 (39.0) | 15.2 (49.9) | 9.4 (30.8) | 12.7 (41.7) | 13.8 (45.3) |
| 15 | .10 (0.33) | .09 (0.30) | .14 (0.46) | .13 (0.43) | .14 (0.46) | .11 (0.36) | .11 (0.36) |
| | .17 (0.56) | .18 (0.59) | .21 (0.69) | .20 (0.66) | .24 (0.79) | .19 (0.62) | .19 (0.62) |
| 16 | 1.73 (5.68) | 1.82 (5.97) | 1.50 (4.92) | 1.72 (5.64) | 1.47 (4.82) | 1.51 (4.95) | 1.65 (5.41) |
| | 1.73 (5.68) | 1.81 (5.94) | 1.58 (5.18) | 1.62 (5.32) | 1.50 (4.92) | 1.51 (4.95) | 1.63 (5.35) |
| | 59 | 56 | 68 | 59 | 69 | 67 | 62 |
| | 59 | 56 | 64 | 62 | 68 | 67 | 62 |
| | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ | >1 × 10 ⁹ |
| | N.E.C. | N.E.C. | N.E.C. | N.E.C. | N.E.C. | N.E.C. | N.E.C. |
| 18 | Article 725, CL2 | Article 725, CL2 | Article 725, CL2 | Article 725, CL2 | Article 725, CL2 | Article 725, CL2 | Article 725, CL2 |
| | 150 | 150 | 300 | 300 | 300 | 300 | 150 |
| | <50 | <50 | <50 | <50 | <50 | <50 | <50 |
| 19 | 75C | 75C | 75C | 75C | 75C | 75C | 75C |
| | 80C | 80C | 80C | 80C | 80C | 80C | 80C |
| 20 | CL2 | CL2 | CL2 | CL2 | CL2 | CL2 | CL2 |
| | IIA/B | IIA/B | IIA/B | IIA/B | IIA/B | IIA/B | IIA/B |
| 21 | 80C 150V FT1 | 80C 150V FT1 | 80C 300V FT1 | 80C 300V FT1 | 80C 300V FT1 | 80C 300V FT1 | 80C 150V FT1 |
| | TS-0672 | TS-0072 | TS-0070 | TS-0083 | TS-0060 | TS-0069 | TS-308 |

3M™ Cable

Cable Properties — Pleated Foil

| Typical Cable Properties | | Pleated Foil Cables | | | | | | | |
|--------------------------|---|---|--|---|---|--|--|--|--|
| | | Flat Jacketed Cables | | | | | | | |
| | | 90101 Series | 90201 Series | 93101 Series | 90111 Series | 90211 Series | 90202 Series | 90104 Series | 90204 Series |
| 1 | Jacket Material | PVC | TPE | PVC | PVC | TPE | TPE | PVC | TPE |
| 2 | Jacket Color | Gray | Gray | Gray | Gray | Gray | Gray | Gray | Gray |
| 3 | Shield | Pleated Foil | Pleated Foil | Pleated Foil | Pleated Foil | Pleated Foil | Pleated Foil | Pleated Foil | Pleated Foil |
| 4 | Primary Insulation Material | TPE | TPE | TPE | TPE | TPE | TPE | TPE | TPE |
| 5 | Primary Color | Translucent | Translucent | Translucent | Translucent | Translucent | Translucent | Translucent | Translucent |
| 6 | First Conductor Marking | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue |
| 7 | Conductor Spacing inch (mm) | .025 (0.64) | .025 (0.64) | .025 (0.64) | .025 (0.64) | .025 (0.64) | .025 (0.64) | .050 (1.27) | .050 (1.27) |
| 8 | Conductor Size | 30 AWG | 30 AWG | 30 AWG | 30 AWG | 30 AWG | 30 AWG | 28 AWG | 28 AWG |
| 9 | Conductor Stranding | Solid (0.254) | Solid (0.254) | Solid (0.254) | Solid (0.254) | Solid (0.254) | 7 × 38 (7 × 0.102) | 7 × 36 (7 × 0.127) | 7 × 36 (7 × 0.127) |
| 10 | Conductor Material | Copper | Copper | Copper | Copper | Copper | Copper | Copper | Copper |
| 11 | Conductor Resistance Ohms / 1000 ft. (Ohms / km) @ 20C | 112 (366) | 112 (366) | 112 (366) | 112 (366) | 112 (366) | 101 (333) | 65 (213) | 65 (213) |
| 12 | Conductor Quantity (For others, contact your sales representative) | 20, 26, 36, 40, 50, 68, 80, 100 | 20, 26, 36, 40, 50, 60, 68, 80, 100 | 50, 68, 80, 100 | 20, 26, 36, 40, 50, 68, 80, 100 | 20, 26, 36, 40, 50, 68, 80, 100 | 20, 26, 36, 40, 50, 60, 68, 80, 100 | 15, 20, 25, 26, 34, 37, 40, 50, 60, 64 | 15, 20, 25, 26, 34, 37, 40, 50, 60, 64 |
| 13 | Impedance (Ohms) Unbalanced Balanced | 53 104 | 53 104 | 53 104 | 72 129 | 72 129 | 46.1 88.5 | 53 110 | 53 110 |
| 14 | Capacitance pF / ft. [pF / m] Unbalanced Balanced | 28.4 (93.2) 14.5 (47.6) | 28.4 (93.2) 14.5 (47.6) | 28.4 (93.2) 14.5 (47.6) | 21.0 (68.9) 11.6 (38.1) | 21.0 (68.9) 11.6 (38.1) | 35.5 (116.0) 18.3 (60.0) | 28.1 (92.2) 13.4 (44.0) | 28.1 (92.2) 13.4 (44.0) |
| 15 | Inductance μH / ft. [μH / m] Unbalanced Balanced | .08 (0.26) .16 (0.52) | .08 (0.26) .16 (0.52) | .08 (0.26) .16 (0.52) | .11 (0.36) .19 (0.62) | .11 (0.36) .19 (0.62) | .07 (0.23) .14 (0.46) | .08 (0.26) .16 (0.52) | .08 (0.26) .16 (0.52) |
| 16 | Signal Speed Propagation Delay ns / ft [ns / m] Unbalanced Balanced Velocity of Propagation % Unbalanced Balanced | 1.52 (4.99) 1.51 (4.95) 67 67 | 1.52 (4.99) 1.51 (4.95) 67 67 | 1.52 (4.99) 1.51 (4.95) 67 67 | 1.51 (4.95) 1.50 (4.92) 67 68 | 1.51 (4.95) 1.50 (4.92) 67 68 | 1.63 (5.35) 1.62 (5.32) 62 62 | 1.49 (4.89) 1.48 (4.86) 68 69 | 1.49 (4.89) 1.48 (4.86) 68 69 |
| 17 | Insulation Resistance Ohms / 10 ft. [3 m] | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ | >1 × 10 ¹⁰ |
| 18 | Voltage Rating US Canada Europe | N.E.C. Article 725, CL2 150 <50 | N.E.C. 150 <50 | N.E.C. Article 725, CL2 150 <50 | N.E.C. Article 725, CL2 150 <50 | 150 150 <50 | 150 150 <50 | N.E.C. Article 725, CL2 150 <50 | 300 150 <50 |
| 19 | Temperature Rating US Canada | 75C 80C | -20C to +105C -20C to +105C | 75C 80C | 75C 80C | -20C to +105C -20C to +105C | -20C to +105C -20C to +105C | 75C 80C | -20C to +105C -20C to +105C |
| 20 | UL Listing - US | CL2 | Style 20674 | CL2 | CL2 | Style 20674 | Style 20297 | CL2 | Style 20674 |
| 21 | UL Listing - Canada | IIA/B 80C 150V FT1 | Optional IA 105C 150V FT1 | IIA/B 80C 150V FT1 | IIA/B 80C 150V FT1 | Optional IA 105C 150V FT1 | Optional IA 105C 150V FT1 | IIA/B 80C 150V FT1 | Optional IA 105C 150V FT1 |
| 22 | Catalog Tech Sheets | TS-0285 | TS-0402 | TS-0876 | TS-0451 | TS-0598 | TS-0730 | TS-0288 | TS-0403 |

TS-0731-08
Sheet 7 of 8

3M™ Cable

Cable Properties — Testing Method Summary

Cables can be used in various conductor configurations. Our testing is performed with what we consider the most typical configuration for the cable construction. See the respective product specification page for the tested configuration for each test value.

Impedance: (Z_0) is calculated — 1000 multiplied by the propagation delay, in nanoseconds per unit length (ns), divided by capacitance, in picofarads per unit length (pF) = Ohms (Ω). This calculation is verified by using a Time Domain Reflectometer (TDR), Tektronix 11801B Digital Sampling Oscilloscope with SD-24 TDR/Sampling head.

$$\text{IMPEDANCE (} \Omega \text{)} = \frac{\left[\text{PROPAGATION DELAY (nS/ft)} \right] \times 1000}{\text{CAPACITANCE (pF/ft)}}$$

Capacitance: (C) is measured — using a digital LCR meter, HP4275A Multi-frequency LCR meter, at 1 MHz, specified in picofarads per foot pF/ft.

Inductance: (L) is calculated — square characteristic impedance (Ω), multiplied by capacitance (pF/ft), divided by 1×10^6 = Inductance (L) in $\mu\text{H/ft}$.

$$\text{INDUCTANCE (} \mu\text{H)} = \frac{\text{IMPEDANCE (} \Omega \text{)}^2 \times \text{CAPACITANCE (pF)}}{1,000,000}$$

Propagation Delay: (Pd) is measured — using a network analyzer, HP8753A, short the far end of a 10 foot cable sample, locate the null at 1 wavelength, multiplied by the reciprocal of the frequency in megahertz (MHz) by 100 = Pd in ns/ft.

$$\text{PD (nS/ft)} = \frac{1}{\text{FREQUENCY (MHz)}} \times 100$$

Insulation Resistance: is measured — at 500 volts, between conductors and water, after one hour immersion.

Important Notice

All statements, technical information, and recommendations related to 3M's products are based on information believed to be reliable, but the accuracy or completeness is not guaranteed. Before using this product, you must evaluate it and determine if it is suitable for your intended application. You assume all risks and liability associated with such use. Any statements related to the product which are not contained in 3M's current publications, or any contrary statements contained on your purchase order shall have no force or effect unless expressly agreed upon, in writing, by an authorized officer of 3M.



Electronic and Interconnect Solutions Division

6801 River Place Blvd.
Austin, TX 78726-9000
www.3M.com/eisd

Warranty; Limited Remedy; Limited Liability.

This product will be free from defects in material and manufacture for a period of 1 year from the date of purchase. **3M MAKES NO OTHER WARRANTIES INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.** If this product is defective within the warranty period stated above, your exclusive remedy shall be, at 3M's option, to replace or repair the 3M product or refund the purchase price of the 3M product. **Except where prohibited by law, 3M will not be liable for any loss or damage arising from this 3M product, whether direct, indirect, special, incidental or consequential regardless of the legal theory asserted.**