

# 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 <sup>10</sup>	>1 × 10 <sup>10</sup>	>1 × 10 <sup>10</sup>	>1 × 10 <sup>10</sup>	>1 × 10 <sup>10</sup>	>1 × 10 <sup>10</sup>
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 <sup>10</sup>	>1 × 10 <sup>10</sup>	>1 × 10 <sup>10</sup>	>1 × 10 <sup>10</sup>	>1 × 10 <sup>10</sup>	>1 × 10 <sup>10</sup>	>1 × 10 <sup>10</sup>	>1 × 10 <sup>10</sup>	
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	— —	— —	— —
	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 <sup>10</sup>	>1 × 10 <sup>10</sup>	>1 × 10 <sup>10</sup>	>1 × 10 <sup>10</sup>	>1 × 10 <sup>10</sup>	>1 × 10 <sup>10</sup>
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  
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# 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 <sup>10</sup>	>1 × 10 <sup>10</sup>	>1 × 10 <sup>9</sup>	>1 × 10 <sup>9</sup>	>1 × 10 <sup>9</sup>	>1 × 10 <sup>9</sup>	>1 × 10 <sup>10</sup>	>1 × 10 <sup>10</sup>
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

# 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 <sup>10</sup>	>1 × 10 <sup>10</sup>	>1 × 10 <sup>10</sup>	>1 × 10 <sup>10</sup>	>1 × 10 <sup>10</sup>	>1 × 10 <sup>10</sup>
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	41	65	65	65	65	65
	(143)	(134)	(213)	(213)	(213)	(213)	(213)
12	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), 60 (30 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)
	59	51	90	62	95	70	67
13	97	100	133	106	160	119	118
	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)
14	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)
	.10 (0.33)	.09 (0.30)	.14 (0.46)	.13 (0.43)	.14 (0.46)	.11 (0.36)	.11 (0.36)
15	.17 (0.56)	.18 (0.59)	.21 (0.69)	.20 (0.66)	.24 (0.79)	.19 (0.62)	.19 (0.62)
	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)
16	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
17	59	56	64	62	68	67	62
	>1 × 10 <sup>10</sup>	>1 × 10 <sup>10</sup>	>1 × 10 <sup>10</sup>	>1 × 10 <sup>10</sup>	>1 × 10 <sup>10</sup>	>1 × 10 <sup>10</sup>	>1 × 10 <sup>9</sup>
18	N.E.C.	N.E.C.	N.E.C.	N.E.C.	N.E.C.	N.E.C.	N.E.C.
	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
19	<50	<50	<50	<50	<50	<50	<50
	75C	75C	75C	75C	75C	75C	75C
20	80C	80C	80C	80C	80C	80C	80C
	CL2	CL2	CL2	CL2	CL2	CL2	CL2
21	IIA/B	IIA/B	IIA/B	IIA/B	IIA/B	IIA/B	IIA/B
	80C 150V FT1	80C 150V FT1	80C 300V FT1	80C 300V FT1	80C 300V FT1	80C 300V FT1	80C 150V FT1
22	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 <sup>10</sup>	>1 × 10 <sup>10</sup>	>1 × 10 <sup>10</sup>	>1 × 10 <sup>10</sup>	>1 × 10 <sup>10</sup>	>1 × 10 <sup>10</sup>	>1 × 10 <sup>10</sup>	>1 × 10 <sup>10</sup>
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	I/A/B 80C 150V FT1	Optional IA 105C 150V FT1	I/A/B 80C 150V FT1	I/A/B 80C 150V FT1	Optional IA 105C 150V FT1	Optional IA 105C 150V FT1	I/A/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  
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# 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 (  $\Omega$  ). 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 (  $\Omega$  ), multiplied by capacitance ( pF/ft ), divided by  $1 \times 10^6$  = 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.



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