3M™ Cable

Cable Properties — Internal Wiring

		Internal Wiring					
		Round Conductor Flat Cable					
	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.	112	112	101	112	104	101
	[Ohms / km]	(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	81	90	73	83	99	82
	Balanced	136	—	122	137	165	138
14	**Capacitance pF / ft [pF / m]**						
	Unbalanced	19.1 (62.7)	16.5 (54.1)	20.8 (68.2)	19.0 (62.3)	13.8 (45.3)	17.3 (56.8)
	Balanced	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	.13 (0.43)	.13 (0.43)	.11 (0.36)	.13 (0.43)	.14 (0.46)	.12 (0.39)
	Balanced	.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	101	65	69	65	65	65	65	60
	(310)	(333)	(213)	(228)	(213)	(213)	(213)	(213)	(198)
12	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	92	114	108	112	117	107	131
	—	144	146	188	—	—	—	176	—
14									
	14.7 (48.2)	17.5 (57.4)	54.5 (16.6)	12.8 (42.0)	12.8 (42.0)	12.7 (41.5)	11.7 (38.4)	14.0 (45.93)	9.9 (32.5)
	—	10.5 (34.5)	32.2 (9.8)	7.4 (24.3)	—	—	—	8.2 (26.95)	—
15									
	.12 (0.39)	.14 (0.46)	0.46 (.14)	.17 (0.56)	.15 (0.50)	.16 (0.52)	.16 (0.52)	.16 (0.53)	.17 (0.56)
	—	.22 (0.72)	0.69 (.21)	.26 (0.85)	—	—	—	.25 (0.84)	—
16									
	1.34 (4.40)	1.56 (5.12)	4.86 (1.48)	1.45 (4.76)	1.40 (4.59)	1.42 (4.66)	1.37 (4.49)	1.50 (4.92)	1.29 (4.23)
	—	1.51 (4.95)	4.69 (1.43)	1.40 (4.59)	—	—	—	1.45 (4.76)	—
	76	65	69	70	73	72	74	68	79
	—	67	71	73	—	—	—	70	—
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	>1 × 10^10
18									
	150	300	300	300	300	300	300	30	300
	—	300	300	300	300	300	—	—	—
	<50	<50	<50	<50	<50	<50	<50	<50	<50
19	-55C to +150C	-20C to +105C	-20C to +105C	-20C to +105C	-20C to +105C	-20C to +105C	-40C to +105C	-40C to +105C	-55C to +200C
	—	-20C to +105C	-20C to +105C	-20C to +105C	-20C to +105C	-20C to +105C		—	—
20	AWM	AWM	AWM	AWM	AWM	AWM	AWM	AWM	AWM
	Style 20726	Style 2651	2651	Style 2651	Style 2651	Style 2651	Style 20297	Style 20930	Style 20424
21		Optional	Optional	Optional	Optional	Optional			
	—	IA	IA	IA	IA	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

		Internal Wiring					
		Round Conductor Flat Cable					
	Typical Cable Properties	**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.	41	41	41	25	16	6
	[Ohms / km]	(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	103	89	104	136	119	127
	Balanced	171	—	—	—	—	—
14	**Capacitance pF / ft [pF / m]**						
	Unbalanced	13.6 (44.62)	16.2 (53.1)	13.1 (42.98)	9.6 (31.5)	11.0 (36.1)	9.6 (31.5)
	Balanced	7.9 (25.91)	—	—	—	—	—
15	**Inductance µH / ft [µH / m]**						
	Unbalanced	.15 (0.49)	.13 (0.43)	.14 (0.46)	.18 (0.59)	.15 (0.49)	.15 (0.49)
	Balanced	.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

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	65	65	41	16	65	65	65
	(204)	(214)	(213)	(134)	(53)	(213)	(213)	(213)
12	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	102	115
	—	—	—	—	—	122	119	139
14								
	13.3 (43.8)	13.3 (43.6)	14.1 (46.3)	14.8 (48.6)	8.4 (27.5)	15.9 (52.2)	16.9 (55.4)	43.6 (13.3)
	—	—	—	—	—	13.3 (43.6)	14.6 (47.9)	36.1 (11.0)
15								
	.15 (0.49)	.15 (0.49)	.15 (0.49)	.13 (0.43)	.20 (0.65)	.16 (0.52)	.18 (0.59)	.59 (.18)
	—	—	—	—	—	.20 (0.66)	.21 (0.69)	.69 (.21)
16								
	1.42 (4.66)	1.42 (4.66)	1.47 (4.82)	1.41 (4.63)	1.29 (4.22)	1.61 (5.28)	1.74 (5.71)	5.0 (1.53)
	—	—	—	—	—	1.63 (5.35)	1.73 (5.68)	5.0 (1.53)
	72	72	69	72	79	63	58	66
	—	—	—	—	—	62	59	66
17	>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	300	300	600	300	150	300
	300	300	150	150	150	150	—	—
	<50	<50	<50	<50	<50	<50	<50	<50
19	-20C to +105C	-20C to +105C	-20C to +105C	-20C to +105C	-20C to +80C	-20C to +105C	-40C to +80C	-20C to +80C
	-20C to +105C	-20C to +105C	-20C to +80C	-20C to +80C	-20C to +80C	-20C to +80C	—	—
20	AWM	AWM	AWM	AWM	AWM	AWM	AWM	AWM
	Style 2651	Style 2651	Style 20462	Style 20462	Style 20122	Style 20462	Style 21008	Style 20488
21	Optional	Optional	Optional	Optional	Optional	Optional	—	—
	IA	IA	IA	IA	IA	IA		
	105C 300V FT1	105C 300V FT1	80C 150V FT1	80C 150V FT1	80C 150V FT1	80C 150V FT1		
22	TS-0058	TS-0059	TS-0123	TS-0122	TS-0079	TS-0115	TS-0762	TS-0999

3M™ Cable

Cable Properties — External Wiring

		Internal Wiring			External Wiring		
		Ground Plane Cable			Round, Jacketed, Discrete, Twisted Pair Cable		
	Typical Cable Properties	**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.	65	65	65	65	65	65
	(Ohms / km) @ 20C	(213)	(213)	(213)	(213)	(213)	(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	65	65	65	58	63	63
	Balanced	—	—	—	91	100	100
14	**Capacitance pF / ft. [pF / m]**						
	Unbalanced	25.1 (82.3)	25.1 (82.3)	25.1 (82.3)	29.2 (95.8)	24.2 (79.4)	24.2 (79.4)
	Balanced	—	—	—	18.5 (60.7)	15.3 (50.2)	15.3 (0.49)
15	**Inductance µH / ft. [µH / m]**						
	Unbalanced	.11 (0.36)	.11 (0.36)	.11 (0.36)	.10 (0.33)	.10 (0.33)	.10 (0.33)
	Balanced	—	—	—	.15 (0.49)	.15 (0.49)	.15 (0.49)
16	**Signal Speed**						
	Propagation Delay						
	ns / ft [ns / m] Unbalanced	1.64 (5.38)	1.64 (5.38)	1.64 (5.38)	1.69 (5.54)	1.54 (5.05)	1.54 (5.05)
	Balanced	--	—	—	1.69 (5.54)	1.54 (5.05)	1.54 (5.05)
	Velocity of Propagation %						
	Unbalanced	62	62	62	60	66	66
	Balanced	—	—	—	60	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**				N.E.C.	N.E.C.	N.E.C.
	US	300	300	300	Article 725, CL2	Article 725, CL2	Article 725, CL2
	Canada	150	150	150	150	150	150
	Europe	<50	<50	<50	<50	<50	<50
19	**Temperature Rating** US	-20C to +105C	-20C to +105C	-20C to +105C	75C	75C	75C
	Canada	-20C to +105C	-20C to +105C	-20C to +105C	80C	80C	80C
20	**UL Listing** - US	AWM	AWM	AWM			
		Style 2682	Style 2682	Style 2682	CL2	CL2	CL2
21	**UL Listing** - Canada	Optional	Optional	Optional			
		IA	IA	IA	IIA/B	IIA/B	IIA/B
		105C 150V FT1	105C 150V FT1	105C 150V FT1	80C 150V FT1	80C 150V FT1	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, Jacket 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)
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)
	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
16	59	56	64	62	68	67	62
17	>1 × 10^10	>1 × 10^10	>1 × 10^10	>1 × 10^10	>1 × 10^10	>1 × 10^10	>1 × 10^9
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
	<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
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

		Pleated Foil Cables							
		Flat Jacketed Cables							
	Typical Cable Properties	**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.	112	112	112	112	112	101	65	65
	(Ohms / km) @ 20C	(366)	(366)	(366)	(366)	(366)	(333)	(213)	(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	53	53	53	72	72	46.1	53	53
	Balanced	104	104	104	129	129	88.5	110	110
14	**Capacitance pF / ft. [pF / m]**								
	Unbalanced	28.4 (93.2)	28.4 (93.2)	28.4 (93.2)	21.0 (68.9)	21.0 (68.9)	35.5 (116.0)	28.1 (92.2)	28.1 (92.2)
	Balanced	14.5 (47.6)	14.5 (47.6)	14.5 (47.6)	11.6 (38.1)	11.6 (38.1)	18.3 (60.0)	13.4 (44.0)	13.4 (44.0)
15	**Inductance µH / ft. [µH / m]**								
	Unbalanced	.08 (0.26)	.08 (0.26)	.08 (0.26)	.11 (0.36)	.11 (0.36)	.07 (0.23)	.08 (0.26)	.08 (0.26)
	Balanced	.16 (0.52)	.16 (0.52)	.16 (0.52)	.19 (0.62)	.19 (0.62)	.14 (0.46)	.16 (0.52)	.16 (0.52)
16	**Signal Speed**								
	Propagation Delay								
	ns / ft [ns / m] Unbalanced	1.52 (4.99)	1.52 (4.99)	1.52 (4.99)	1.51 (4.95)	1.51 (4.95)	1.63 (5.35)	1.49 (4.89)	1.49 (4.89)
	Balanced	1.51 (4.95)	1.51 (4.95)	1.51 (4.95)	1.50 (4.92)	1.50 (4.92)	1.62 (5.32)	1.48 (4.86)	1.48 (4.86)
	Velocity of Propagation %								
	Unbalanced	67	67	67	67	67	62	68	68
	Balanced	67	67	67	68	68	62	69	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**	N.E.C.		N.E.C.	N.E.C.			N.E.C.	
	US	Article 725, CL2	150	Article 725, CL2	Article 725, CL2	150	150	Article 725, CL2	300
	Canada	150	150	150	150	150	150	150	150
	Europe	<50	<50	<50	<50	<50	<50	<50	<50
19	**Temperature Rating** US	75C	-20C to +105C	75C	75C	-20C to +105C	-20C to +105C	75C	-20C to +105C
	Canada	80C	-20C to +105C	80C	80C	-20C to +105C	-20C to +105C	80C	-20C to +105C
20	**UL Listing** - US	CL2	Style 20674	CL2	CL2	Style 20674	Style 20297	CL2	Style 20674
21	**UL Listing** - Canada		Optional			Optional	Optional		Optional
		IIA/B	IA	IIA/B	IIA/B	IA	IA	IIA/B	IA
		80C 150V FT1	105C 150V FT1	80C 150V FT1	80C 150V FT1	105C 150V FT1	105C 150V FT1	80C 150V FT1	105C 150V FT1
22	**Catalog Tech Sheets**	TS-0285	TS-0402	TS-0876	TS-0451	TS-0598	TS-0730	TS-0288	TS-0403

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_o) 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.

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

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 $1X10^6$ = Inductance (L) in μH/ft.

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

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.

Please contact your 3M Sales Representative if a more detailed description of these test methods is desired.

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.

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.**

3M

Electronic and Interconnect Solutions Division

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