

- Low flammability
- Low smoke generation
- Low toxicity index
- Low generation of corrosive gases
- Small size, lightweight

Type 99M

Wire and cable

Type 99M wire has a dual wall construction of radiation cross-linked modified polyester. This combines excellent mechanical performance and chemical resistance with a range of enhanced fire hazard properties. Type 99M wire is designed to meet the stringent low hazard performance now being specified by many authorities, in particular for naval, mass transit and industrial control panel wiring.

During the 1980's there were major changes in the demands of many wire and cable specifications to reduce the risks associated with all aspects of fire hazards. Specifications such as Def Stan 61-12 Part 18, have been developed over the last decade demanding improved performance of wires and cables under fire conditions.

This has led to a tightening of the requirements for flammability, smoke generation, corrosive gas generation and

hazardous fume emission.

Type 99M wire achieves these improvements in performance whilst retaining small size, light weight, flexibility, handleability, resistance to carbon arc tracking and resistance to chemicals and fluids.

Approvals

Raychem WCD 281





Def Stan 61-12 Part 18 Issue 4 Type 1

Italian Navy STN-SR-01

Lloyds Register

Type 99M wire and cable - nominal sizes, strandings and weights

Primary wires/screened and jacketed cables - 99M

		99M011X (600 V) primary wire		99M021X (1000 V) primary wire		99M1111 screened & jacketed		99M1121 screened & jacketed	
									
Size	Stranding (mm)	OD (mm)	Weight (g/m)	OD (mm)	Weight (g/m)	OD (mm)	Weight (g/m)	OD (mm)	Weight (g/m)
26	19x0.10	0.88	2.0	1.01	2.2	1.80	7.5	2.91	13.3
24	19x0.12	0.98	3.0	1.17	3.4	1.90	9.2	3.20	16.6
22	19x0.15	1.13	4.4	1.37	4.9	2.05	11.1	3.52	20.5
20	19x0.20	1.40	6.5	1.57	7.3	2.30	14.6	4.02	27.7
18	19x0.25	1.65	9.9	1.85	10.9	2.55	19.3	4.57	37.1
16	19x0.30	1.90	14.15	2.10	14.5	2.95	24.9	5.13	48.5
14	37x0.25	2.25	18.62	2.50	21.8	3.13	30.9	5.72	60.5
12	37x0.32	2.60	25.7	2.97	31.3	3.48	43.4	6.42	86.0

Physical characteristics

Handleability

Type 99M wire has been designed to be readily handleable by modern wiring and harnessing techniques. It is a flexible wire with virtually no springback once set. It is easily stripped with tools such as conventional die-blade strippers.

Small size

Type 99M equipment wire has a nominal 0.2 mm insulation wall thickness which is comparable to other established thin wall wires such as Spec 44 wire.

Light weight

Type 99M wire is designed to have the same weights as Spec 44 wire.

Type 99M

Typical properties

Test	Method	Typical value
Temperature rating	BS G230	125°C
Voltage rating	Raychem	600 V thin wall
Tensile strength/elongation of insulation		30 MPa/250%
Notch propagation (0.05 mm notch)	BS G230	Pass
Shrinkage 200°C	BS G230	<1%
Low temperature bend	BS G230	-55°C
Voltage withstand	BS G230	2.5 kV
Insulation resistance (20°C)	BS G230	1000 M ohms km (min)
Pliability rating	Def Stan 61-12 (18)	82 - Pliable
Fluid resistance	Def Stan 61-12 (18)	
Fuels - aircraft		Pass
Oils - (ASTM No 3)		Pass
Solvents		Pass

Environmental properties

Mechanical performance

The scrape abrasion and cut through resistance of Type 99M wire out performs the well-established performance of Spec 44 wire throughout its operating temperature range.

Fluid resistance

Type 99M wire demonstrates outstanding resistance to most acids, alkalis, hydrocarbon solvents, fuels, lubricants and water.

Electrical arc tracking

Type 99M wire is resistant to electrical arc tracking under both wet and dry conditions

Voltage ratings

Standard available voltage ratings for Type 99M wire are 600 V (0.2 mm wall thickness) and 1000 V (0.3 mm wall thickness).

Fire hazard characteristics

Low Toxicity Index

Type 99M wire is designed to meet the low hazardous fume emission levels required in modern specifications.

For example, the change in the Toxicity Index requirement from 1.5 to 0.2 between Issue 2 and Issue 3 of Defence Standard 61-12 (Part 18), is met by Type 99M wire.

Flammability

Type 99M wire has passed some of the most stringent flammability tests, such as the test in IEC 332 Part 3 (ladder test) and Underwriters Laboratory for VW1 (individual wire).

Smoke generation

Type 99M wire has been designed to meet stringent smoke tests such as those specified in Def Stan 61-12 (Part 18) and in many mass transit specifications.

Corrosivity

Type 99M wire has a low corrosive gas emission, demonstrated by its low acid gas value and meets the latest requirements of low fire hazard specifications.

Fire hazard properties

Test	Method	Typical value
Flammability	IEC 332 Pt 3	Pass
Toxicity index	Def Stan 61-12 (18)	0.1 per metre of wire
Smoke index	Def Stan 61-12 (18)	8 per metre of wire
Acid gas equivalent	TDE 76/P/76	<1.5%

Type 99M

Part numbering system	99	X	X	X	X	X	Size-	X/X-	X	
										<ul style="list-style-type: none"> Jacket colour (in accordance with MIL-STD-681, black preferred) Primary wire insulation colour 0=Black 3=Orange 7=Violet 1=Brown 4=Yellow 8=Grey 2=Red 5=Green 9=White 2L=Pink 6=Blue Additional number after base colour indicates stripe Conductor size Conductor type 1 - Tin-plated copper 9 - Bare copper Number of conductors 1, 2, 3, 4 etc. Class of wire 1 - 600V equipment wire 2 - 1000V equipment wire Construction 0 - Primary wire & unscreened, unjacketed cables 1 - Round braid screened & jacketed* 9 - Special construction Wire type M - Military wire Basic specification number

*The cable jackets are Raychem Zerohal and the preferred colour is black.

Typical ordering example

Two conductors, transit wire, black, red components, black jacket. Round braid screened, size 20 conductor, 600 volt. Part number is 99T1121-20-0/2-0.

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