Raychem

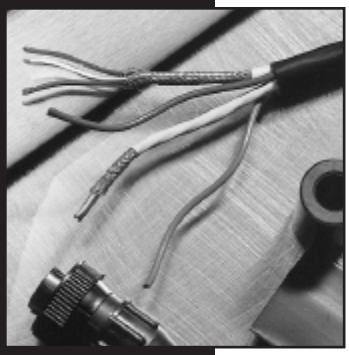
Versatile Raychem brand heat-shrinkable tubing products will cover just about all your needs. With high-performance tubing from Tyco Electronics you can cover, protect, bundle, strain-relieve, seal, identify – and otherwise take care of – a broad range of projects.

Single wall tubing gives optimum flexibility and space savings along with mechanical protection and chemical resistance. Dual wall tubing, with inner walls of adhesive or encapsulant, also reliably seals out moisture. Elastomeric tubing products are specifically designed for use in

Electrical insulation/strain relief/flame-retardance

General-purpose polyolefin tubing is widely used to provide insulation and strain relief of wire terminations and connections, plus a variety of other applications.

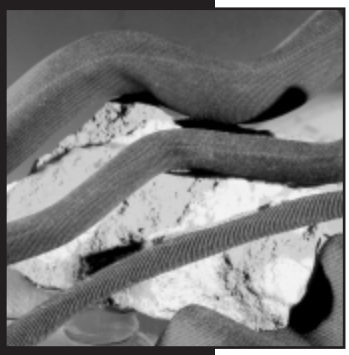
- The tubing is cost effective, and with its low shrink temperature, installs quickly.
- It is flexible but does not easily wrinkle when bent.
- Flame-retardant tubing is available in a wide range of sizes and colors.
- Most polyolefin tubing products meet UL and CSA standards for a wide range of commercial applications as well as military specifications.



Wire Bundling

Raychem single wall tubing products allow you to bundle wires to create very flexible, light-weight harnesses that can stand up to harsh environments. Raychem elastomeric tubings are intended for use in the most rugged harnessing applications where abrasion and temperature resistance as well as resistance to chemicals and fluids are required.

- The broad range of tubing products in the Raychem line ensures that the appropriate solution to your wire bundling and harnessing requirements will be available.
- A variety of tubing products meet military and commercial standards.
- Where space saving is important, very-thin-wall tubing allows you to pack components tightly.



Mechanical protection

Raychem tubing products provide mechanical protection to assure reliability of harnesses and terminations.

- Many tubing products offer excellent protection for cables and harnesses that are dragged along the ground, flexed frequently, or subjected to abrasion during installation.
- HFT5000 heat-shrinkable fabric tubing is designed to provide mechanical protection for components such as rubber hoses, plastic pipes, and harness wiring bundles.
- Semirigid tubing products provide strain relief to ensure that delicate connections will be protected from damage during use.

Environmental sealing and protection

High-shrink-ratio tubing products environmentally protect connector-to-cable transitions. The adhesives used in our dual wall tubing products bond to a wide variety of plastics, rubbers and metals.

- High shrink ratios accommodate large size differences between cables and cable connectors and backshells, thus simplifying cable repair.
- Medium-wall tubing is available for increased mechanical protection.
- Other tubing products are available in flexible, semirigid, or flame-retardant materials.

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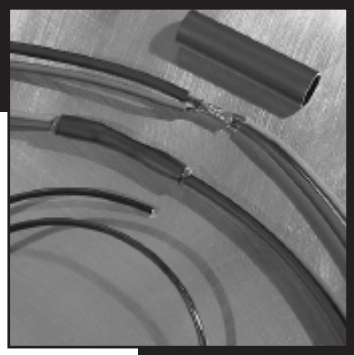
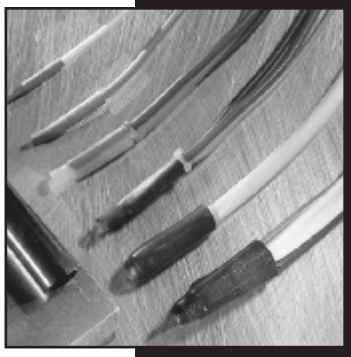
applications where resistance to abrasion, chemicals and other fluids, and flexibility over a wide range of temperatures is required. Heavy duty tubing products are intended for use in the most rugged environments. The Altera family of medical-grade tubing products is specifically designed to meet the needs of the medical device industry. Whether your application is commercial, industrial, or military, there are Raychem brand tubing products to meet your precise needs.



Protection from moisture and corrosion

Adhesive-lined, flexible polyolefin tubing seals and protects electrical splices and in-line electronic components from fluids, moisture and corrosion. Rugged, adhesive-lined tubing protects wiring and components from the corrosive effects of moisture, engine fuels and lubricants.

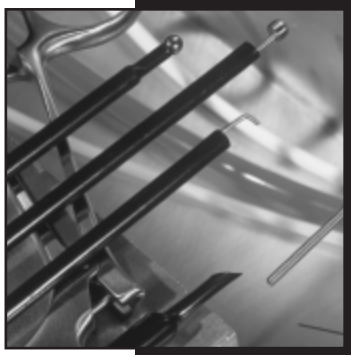
- Tubing provides one-step electrical insulation and moisture sealing.
- When adhesive-lined flexible polyolefin tubing is used both the tubing and adhesive are flexible, creating a moisture seal that accommodates bending.
- In more rugged applications, specially formulated hot-melt adhesive forms an effective barrier against fluids and moisture.
- The dimensions of some tubing products are engineered to accommodate multiple wire splices.



Mechanical and environmental protection

Heat-shrinkable end caps fully encapsulate or seal terminations and protect them from dust, dirt, and moisture. The encapsulant or adhesive lining in the caps melts and flows to fill surface irregularities in the substrate.

- End caps inexpensively insulate and encapsulate or seal crimped electrical connections.
- These caps resist abrasion, vibration and flexing.
- End caps' splash resistant, moisture resistant coverings provide environmental protection.



Insulation and protection of medical devices

The Altera family of medical-grade tubing products is specifically designed to fulfill various application requirements found in medical devices and components.

- Altera medical-grade tubing products are qualified to the stringent requirements of USP Class VI.
- Flexible MT5000 is available in a variety of sizes and colors and provides good electrical insulation properties.
- MT2000 is especially suitable for applications requiring lubricity, flexibility, and excellent electrical insulation properties and is a cost effective alternative to FEP tubing
- MT1000 and MT3000 offer thin walls, resistance to a variety of fluids, and high temperature performance.
- MicroFit tubing versions of Altera products are suitable for use in applications requiring tubing with a recovered inside diameter as small as 0.178mm [0.007"].

Protection from impact and abrasion

Heavy duty tubing products were designed for applications where strength and durability are needed such as underground splice sealing, high ratio back end connector sealing, battery terminal insulation, and mechanical protection for wiring systems.

- Thick wall tubing is highly resistant to impact and abrasion and provides a high level of strain relief.
- Flame-retardant and halogen-free tubing products are available.
- Heavy duty tubing products are resistant to chemicals, moisture and oils.

Product Category	Product Name	Operating Temperature °C[°F]	Minimum Full Recovery Temperature °C[°F]	Shrink Ratio	Product Description	Features/Benefits
Single Wall	CGPE-105	-70 to 105 [-40 to 257]	Black 110 [230]; All Others 100 [212]	2:1	Flexible, brightly colored, non-flame-retardant polyolefin	Bright, shiny appearance; clear offers exceptional clarity. Easily hotstamped.
	CRN	-55 to 135 [-67 to 275]	135 [275]	2:1	Semirigid polyolefin tubing	High abrasion resistance. Transfers flex stress away from typically weak points. Excellent chemical and solvent-resistance properties.
	DCPT	-55 to 135 [-67 to 275]	120 [248]	2:1	Flexible, flame-retardant, dual-color polyolefin tubing	Dual colors (yellow/green) for instant identification. Color permanence superior to conventional ink marking.
	RNF-100	-55 to 135 [-67 to 275]	121 [250]	2:1	Flexible, flame-retardant, general purpose polyolefin tubing	Excellent physical, chemical and electrical properties. Abrasion and solvent resistance superior to that of many polyolefin tubings. Wide range of sizes and colors.
	RNF-3000	-55 to 135 [-67 to 275]	120 [248]	3:1	Flexible, high-shrink-ratio, flame-retardant, general purpose polyolefin tubing	3:1 shrink ratio easily accommodates irregular shapes. Few sizes cover a wide range of diameters. Flame-retardant (colors only)
	RP-4800	-55 to 135 [-67 to 275]	121 [250]	4:1	Flexible, high-shrink-ratio, flame-retardant polyolefin tubing	Conforms well to highly variable substrate dimensions. Excellent physical, chemical and electrical properties
	RT-3	-55 to 135 [-67 to 275]	135 [275]	2.5:1	Semirigid, flame-retardant polyolefin tubing	Excellent mechanical properties; transfers flex stress away from typically weak points. Tightly controlled expanded diameters; well suited for semi-automated installation.
	VERSAFIT	-55 to 135 [-67 to 275]	90 [194]	2:1	Highly flame-retardant, very flexible, low-shrink temperature polyolefin tubing	Meets AMS-DTL-23053/5, Cl.1 and 3 as well as UL and CSA standards. UL/CSA VW-1 flame rating. Low shrink temperature for fast installation.
	VERSAFIT V2	-30 to 125 [-22 to 257]	90 [194]	2:1	Highly flame-retardant, very flexible, low-shrink-temp-erature metric-sized polyolefin tubing	Many sizes to cover a wide variety of applications. UL/CSA VW-1 flame rating. Low shrink temperature for fast installation.
	VERSAFIT V4	-30 to 125 [-22 to 257]	90 [194]	2:1	Very-thin-wall, very flexible, highly flame-retardant, low-shrink-temperature imperial- and metric-sized polyolefin tubing	Very thin wall and low shrink temperature for fast installation and space savings. UL/CSA VW-1 flame rating.
Dual Wall	ATUM	-55 to 110 [-67 to 230]	110 [230]	3:1 & 4:1	High-shrink-ratio, adhesive-lined polyolefin tubing	3:1 and 4:1 shrink ratios allow for connector-to-cable sealing. Medium wall provides increased mechanical protection. ATUM adhesive bonds to a wide variety of materials.
	DWP-125	-40 to 110 [-40 to 230]	125 [257]	3:1	Flexible, high-shrink-ratio, adhesive-lined polyolefin tubing	3:1 shrink ratio allows for insulation and sealing of irregular shapes. Medium wall provides increased mechanical protection while maintaining flexibility when installed. Adhesive bonds to a wide variety of materials.

Standard Size Range (Inside Diameter as supplied) MM [In.]	Colors	Applicable Specifications	Flammability Rating	Typical Applications
1.2 to 50.8 [0.046 to 2.000]	Standard:Black, white, clear, red, blue and yellow; Nonstandard:Green and violet	CGPE-105 SCD	N/A	Insulation and protection of components and wires. Color coding and identification. Clear tubing is ideal for protecting marked surfaces.
1.2 to 19.1 [0.046 to 0.750]	Standard:Black; Nonstandard:Clear	RT-360; AMS-DTL-23053/6, Cl. 1 & 2; UL/CSA (Black only)	AMS-DTL-23053 Test B (Black only); UL/CSA All Tubing Flame Test (Black Only)	Strain relief, insulation and mechanical protection of soldered or crimped connections, wire splices and terminations.
3.0 to 38.0 [0.118 to 1.500]	Yellow/green stripe	RW-2056; UL/CSA	UL/CSA All Tubing Flame Test	Identification of "ground" on wires and cables.
1.2 to 127.0 [0.046 to 5.000]	Standard: Black (all sizes); White, blue, yellow, green and clear (sizes 3/64" through 3"); Nonstandard: White, red, blue, yellow, green and clear (sizes 4" and 5"); Brown, violet, orange and gray (all sizes)	RT-350; AMS-DTL-23053/5, Cl. 1 & 2; UL/CSA	AMS-DTL-23053 Test B (Colors only); UL/CSA All Tubing Flame Test (Colors only)	Insulation and strain relief of wire terminations and connections. Jacketing wire bundles and harnesses where superior abrasion resistance is a plus. Color coding and identification. Protection of wire markers (clear).
1.5 to 39.0 [0.060 to 1.534]	Standard: Black; Nonstandard: White, red, blue, yellow, green, brown, orange, violet, gray and clear (non-flame-retardant)	RW-2053; UL/CSA	UL/CSA All Tubing Flame Test (Colors only)	Insulation and strain relief of wire terminations and electrical connections. Electrical and mechanical protection of components with irregular dimensions.
19.1 to 114.3 [0.750 to 4.500]	Standard: Black; Nonstandard: White, red, blue, yellow, green, brown, orange, violet, and gray	RT-1112; AMS-DTL-23053/5, Cl.1 Overexpanded; UL (Black only)	AMS-DTL-23053 Test B; UL All Tubing Flame Test (Black only)	Repair of harness and cable jackets; will pass over large-diameter connectors or transitions then shrink tightly on harnesses and cables. Provides abrasion and fluid resistance required in many harness applications.
6.1 to 12.3 [0.240 to 0.485]	Black	RT-360; UL/CSA	UL/CSA All Tubing Flame Test	Strain relief, insulation and mechanical protection of soldered or crimped connections, wire splices and terminations. Mechanical protection of delicate components.
1.2 to 101.6 [0.046 to 4.000]	Standard: Black, white, red blue, yellow, and green; Nonstandard: Brown, orange, violet and gray	RW-3009; AMS-DTL-23053/5, Cl. 1 & 3; UL/CSA VW-1	AMS-DTL-23053 Test C; UL/CSA VW-1	Insulation and protection of in-line components, wire splices and terminations. Very flexible light-duty military and commercial harnessing. Use where a UL/CSA VW-1 flame rating is needed. Use where rapid installation is desirable.
0.8 to 30.0 [0.032 to 1.181]	Standard: Black; Nonstandard: White, red, blue, yellow, green, brown, orange, violet, and gray	RW-3023; UL/CSA VW-1	UL/CSA VW-1	Insulation and protection of in-line components, wire splices and terminations. Very flexible Light-duty harnessing. Use where a UL/CSA VW-1 flame rating is needed Use where rapid installation is desirable.
Imperial: 1.2 to 25.4 [0.046 to 1.000]; Metric: 1.0 to 10.0 [0.039 to 0.394]	Standard: Black; other colors available upon request	RW-3023; UL/CSA VW-1	UL/CSA VW-1	Insulation of in-line components, wire splices and terminations. Especially suited for covering temperature-sensitive components and wires. Strain relief on high-density connectors.
3:1: 3.0 to 40.0 [0.118 to 1.570]; 4:1: 4.0 to 52.0 [0.158 to 2.050]	Standard: Black; Nonstandard: Clear (non-flame-retardant); other colors available upon request	RW-2063 (Black), RK-6024 (Clear and colors); AMS-DTL-23053/4, Cl. 3; UL (Black only, except sizes 3/1 and 4/1)	AMS-DTL-23053 Test B (Black only)	Sealing and protection of connector backshells, breakouts and connector-to-cable transitions. High shrink ratio allows for repair of damaged cable jackets without removing connectors.
3.2 to 50.8 [0.125 to 2.000]	Standard: Black; Nonstandard: White, red, blue, yellow, green and clear (non-flame-retardant); other colors available upon request	DWP-125 SCD; UL/CSA; AMS-DTL-23053/4, Cl. 3*	UL/CSA All Tubing Flame Test (Colors only); AMS-DTL -23053 Test B (Colors only)	Sealing and protection of wire splices, break-outs and connector-to-cable transitions. Ideal for applications where a UL recognized/CSA certified adhesive-lined tubing is required.
		*Meets the material properties except for sealing efficiency		

Product Category	Product Name	Operating Temperature °C[°F]	Minimum Full Recovery Temperature °C[°F]	Shrink Ratio	Product Description	Features/Benefits
Dual Wall (contd)	ES1000	-40 to 130 [-40 to 266]	135 [275]	4:1	Clear, high-shrink-ratio, adhesive-lined semirigid polyolefin tubing	4:1 shrink ratio allows a few sizes to cover a wide range of splice and component diameters. Mechanically tough providing strain relief and abrasion protection.
	ES2000	-40 to 130 [-40 to 266]	135 [275]	4:1	Flame-retardant, high-shrink-ratio, adhesive-lined semirigid polyolefin tubing	4:1 shrink ratio allows a few sizes to cover a wide range of splice and component diameters. Flame-retardant and mechanically tough providing strain relief and abrasion protection.
	FL2500	-40 to 135 [-40 to 275]	135 [275]	4:1	Fully flame-retardant, high-shrink-ratio, adhesive-lined semirigid polyolefin tubing	4:1 shrink ratio allows a few sizes to cover a wide range of splice and component diameters. Flame-retardant jacket and adhesive.
	HTAT	-55 to 125 [-67 to 257]	135 [275]	4:1	Semiflexible, high-shrink-ratio, adhesive-lined polyolefin tubing	4:1 shrink ratio allows for connector-to-cable sealing. Medium wall provides increased mechanical protection High-temperature adhesive forms a strong bond to a variety of materials.
	SCL	-55 to 110 [-67 to 230]	135 [275]	3:1	Semirigid, encapsulant-lined polyolefin tubing	Splash-resistant, moisture-resistant covering. Provides rugged protection against abrasion, vibration and flexing.
	SCT	-40 to 150 [-40 to 302]	135 [275]	4:1	Flame-retardant, adhesive-lined semirigid polyolefin tubing (extended temperature range)	4:1 shrink ratio allows a few sizes to cover a wide range of splice and component diameters. Flame-retardant and mechanically tough. Adhesive wall forms a barrier against fluids and moisture at an extended temperature range.
	TAT-125	-55 to 110 [-67 to 230]	121 [250]	2:1	Flexible, adhesive-lined polyolefin tubing	Flexible adhesive lining and tubing jacket. Thin adhesive lining to seal simple constructions. Good mechanical strength and cut-through resistance. Adhesive bonds to a wide variety of materials.
Heavy Duty	BSTS/ BSTS-FR	-55 to 90 [-67 to 194]	121 [250]	3:1	Rugged, thick wall, general purpose polyolefin tubing	Excellent thick-wall insulation and abrasion protection. BSTS-FR is flame-retardant.
	HF	-55 to 90 [-67 to 194]	121 [250]	3:1	High-flex, heavy-wall polyolefin tubing	Offers high flexibility. Excellent insulation and abrasion protection. Flame-retardant.
	HRHF/HRNF/ HRSR	-55 to 90 [-67 to 194]	121 [250]	5.6:1	High-ratio, durable heavy-wall polyolefin tubing	Excellent insulation and abrasion protection. Available in flame-retardant material. Available with factory-applied sealants.
	RHW	-55 to 110 [-67 to 230]	125 [257]	3:1	Rugged, heavy wall, adhesive-lined polyolefin tubing	Highly resistant to impact, flexing and abrasion for increased product reliability. Resistant to chemicals, moisture and oils. Provides a moisture-proof seal to prevent corrosion.
	RMW	-55 to 110 [-67 to 230]	125 [257]	3:1	Medium wall, general purpose polyolefin tubing	Highly resistant to impact and abrasion for increased product reliability. Resistant to chemicals and moisture. Adhesive-lined version provides a moisture-proof seal to prevent corrosion.
	SST/SST-FR	-55 to 90 [-67 to 194]	121 [250]	3:1	Thick wall, adhesive-lined polyolefin tubing	Thick wall insulation, strain relief and abrasion protection. Thick adhesive liner forms a barrier against fluids and moisture. SST-FR is flame-retardant.

Standard Size Range (Inside Diameter as supplied) MM [In.]	Colors	Applicable Specifications	Flammability Rating	Typical Applications
5.72 to 17.78 [0.225 to 0.700]	Clear	RT-1113; UL	N/A	Specially designed for environmental sealing and electrical insulation of wire splices, terminations and components where see-through inspection is required.
5.72 to 17.78 [0.225 to 0.700]	Black	RT-1112; UL	ASTM D 2671, Procedure B	Specially designed for environmental sealing and electrical insulation of wire splices, terminations and components.
7.62 to 17.79 [0.300 to 0.700]	Black	FL2500 SCD	SAE J1128, Note 5	Fully flame-retardant and mechanically tough to provide strain relief and abrasion protection of wire splices, terminals, fuse links and in-line components.
4.0 to 48.0 [0.158 to 1.890]	Black	RW-2052	ASTM D 2671, Procedure B	Sealing and protection of connector back-shells, breakouts and connector-to-cable transitions at elevated temperatures. High shrink ratio allows HTAT to provide superior environmental protection to a wide range of shapes with irregular dimensions.
3.2 to 25.4 [0.125 to 1.000]	Black plus one additional color per size (except 1")	RT-1301; AMS-DTL-23053/4, Cl. 1; UL	N/A	Encapsulation of components, splices, and terminations where splash resistance and mechanical protection are required.
7.6 to 17.8 [0.300 to 0.700]	Black	SCT SCD	ASTM D 2671, Procedure B	Specially designed for insulation, strain relief and sealing of automotive wire splices and components in an under-hood automotive environment.
3.2 to 101.6 [0.125 to 4.000]	Standard: Black; Nonstandard: White, red, blue, yellow, green, brown, orange, violet, gray, clear (non-flame-retardant).	TAT-125 SCD; AMS-DTL-23053/4, Cl. 2; UL	AMS-DTL-23053 Test B	Sealing and protection of simple in-line splices, bimetallic joints, and components from fluids, moisture, and corrosion. Repair damaged wire insulation, especially where flexibility is required.
7.62 to 114.30 [0.300 to 4.500]	Standard: Black; Nonstandard: Red, white, and clear (non-flame-retardant)	RW-2017; AMS-DTL-23053/15, Cl. 1 and 2 (except coating requirement); ABS	AMS-DTL-23053 Test C (Flame-retardant) version only); ASTM D 685	Used in demanding applications where insulation, abrasion resistance and strain relief are required. Resists moisture, fungus and weathering.
10.16 to 68.58 [0.400 to 2.70]	Black	RW-2023; AMS-DTL-23053/15, Cl. 1 (except coating requirement); ABS	AMS-DTL-23053 Test C	Ideal for jacketing cables where sharp bends or turns are required. Also ideal for applications where the cable is subject to motion.
15.24 to 101.60 [0.600 to 4.000]	Standard: Black; Nonstandard: Clear (non-flame-retardant)	RW-2013; ABS	AMS-DTL-23053 Test C (Flame-retardant version only)	Designed to accommodate large size differences between cable diameters and cable connectors and backshells to simplify cable repair and protection.
9.0 to 180.0 [0.354 to 7.087]	Standard: Black (all sizes), red (limited size range)	RHW SCD; UL (limited size range)	N/A	Insulation, protection and sealing of electrical connections and joints in low-voltage cables. Combines maximum reliability and product performance with simplified installation.
10.0 to 180.0 [0.394 to 7.087]	Black	RMW SCD	N/A	Insulation and protection of cable joints as well as cable repair. Uncoated RMW provides insulation and strain relief. Adhesive-lined RMW also provides an environmental seal.
7.62 to 114.30 [0.300 to 4.500]	Standard: Black; Nonstandard: Red, white, and clear (non-flame-retardant)	RW-2011; AMS-DTL-23053/15, Cl. 1 and 2	AMS-DTL-23053 Test C (Flame-retardant version only)	Insulation, strain relief, and sealing of splices in wire harnesses. Environmental protection in wet or underground applications.

Product Category	Product Name	Operating Temperature °C[°F]	Minimum Full Recovery Temperature °C[°F]	Shrink Ratio	Product Description	Features/Benefits
Special Purpose	DR-25	-75 to 150 [-103 to 302]	175 [347]	2:1	Flexible, chemical and abrasion-resistant tubing	Long-term fluid and heat resistance. Resistance to aviation and diesel fuels, and hydraulic fluids. Flexible, flame-retardant.
	ES Caps	-40 to 105 [-40 to 221]	135 [275]	4:1	High-shrink-ratio, adhesive-lined semirigid polyolefin caps	4:1 shrink ratio allows a few sizes to cover a wide range of splice diameters. Mechanically tough jacket provides strain relief and abrasion protection. Flame-retardant jacket (black only).
	HCTE	-55 to 200 [-67 to 392]	N/A	N/A	Irradiated, modified ETFE helical convolex conduit	Helical construction with excellent flexibility and high crush resistance. Highly flame-retardant. Highly fluid resistant.
	HFT5000	-40 to 125 [-40 to 257] for 3,000 hours; -40 to 150 [-40 to 302] for 1,000 hours	110 [230]	2:1	Heat-shrinkable fabric tubing	Highly flexible for easy installation on a variety of substrates. Outstanding abrasion resistance over a wide temperature range. Heat-shrinkable to grip tightly. Resistant to harsh environments. Halogen-free.
	MicroFit	RW-175 & MT1000: -55 to 175 [-67 to 347]; MT2000: -40 to 105 [-40 to 221]	RW-175 & MT1000: 175 [347]; MT2000: 140 [284]	2:1 to 3:1	Small-diameter, high-shrink-ratio heat-shrinkable tubing	Available in very small diameters with high-shrink ratios and thin walls. Available in polyolefin and fluoropolymer materials for a variety of applications.
	MT1000	-55 to 175 [-67 to 347]	175 [347]	2:1	Medical-grade, USP Class VI, high-temperature, semirigid fluoropolymer tubing	Tough, semirigid, very-thin-wall insulation. Compatible with gamma, ETO, steam, and dry heat sterilization. Available with inner adhesive liner in sizes 1/8" and larger.
	MT2000	-40 to 105 [-40 to 221]	140 [284]	2.5:1	Medical-grade, USP Class VI, lubricious, thin-wall polyolefin tubing	Lubricity comparable to FEP. Excellent electrical insulation properties. Compatible with gamma & ETO sterilization. Available with inner adhesive liner in sizes 3.0mm and larger.
	MT3000	-55 to 150 [-67 to 302]	150 [302]	2:1	Medical-grade, USP Class VI, high-temperature, flexible fluoropolymer tubing	Tough, flexible, very-thin-wall insulation. Compatible with gamma, ETO, and dry heat sterilization and limited cycles of steam sterilization.
	MT5000	-70 to 105 [-94 to 221]	110 [230]	2:1	Medical-grade, USP Class VI, flexible polyolefin tubing	Flexible tubing with excellent electrical insulation properties. Available in a variety of colors. Compatible with gamma and ETO sterilization. Available with inner adhesive liner in sizes 1/8" & larger.
	NT	-55 to 90 [-67 to 194]	135 [275]	2:1	Flexible, general purpose, modified elastomeric tubing	Remains flexible at temperatures as low as -55°C [-67°F]. Good resistance to abrasion and physical abuse. Resistant to most common fluids and solvents.
	NT-MIL	-70 to 121 [-94 to 250]	135 [275]	2:1	Flexible, rugged, modified elastomeric tubing	Remains flexible at temperatures as low as -70°C [-94°F]. Excellent resistance to abrasion and physical abuse. Resistant to most fluids and solvents, including fuels and oils.
	NTFR	-70 to 121 [-94 to 250]	135 [275]	2:1	Very flexible, rugged neoprene elastomer tubing	Performance exceeds the stringent requirements of AMS-DTL-23053/1, Cl. 2. Outstanding resistance to abrasion and physical abuse. Resistant to most fluids and solvents, including fuels, oils

Standard Size Range (Inside Diameter as supplied) MM [In.]	Colors	Applicable Specifications	Flammability Rating	Typical Applications
3.2 to 76.0 [0.125 to 3.000]	Black	RT-1116; AMS-DTL-23053/16	AMS-DTL-23053 Test B	Particularly suitable as a jacketing material for cables and harnesses on military ground vehicles and race cars.
5.72 to 10.85 [0.225 to 0.427]	Black and Clear	RW-3006; UL	ASTM D 2671, Procedure B (Black only)	Specially designed to provide mechanical and environmental protection of stub splices in electrical harnesses. Clear caps allow see-through inspection.
4.6 to 49.2 [0.181 to 1.937]	Black	RT-1162	ASTM D 876	Mechanical protection for electrical wiring systems in applications requiring flexibility, high temperature performance, and good solvent resistance.
12.0 to 70.0 [0.472 to 2.756]	Black	RW-2060; UL	MVSS 302	Abrasion protection for rubber hoses, plastic pipes, and harness wire bundles. Provides outstanding abrasion, chafing and cut-through protection even at high temperatures.
0.356 to 1.143 [0.014 to 0.045]	Standard: Translucent (RW-175 & MT1000); Black & clear (MT2000); Nonstandard: Black (RW-175 & MT1000); White, red, yellow, blue and orange (MT2000)	MT1000 and MT2000: Altera MicroFit SCD, USP Class VI (Material); RW-175: RW-175 MicroFit SCD	N/A	Insulation, mechanical protection and strain relief in smaller, more compact medical devices and commercial electronics products. The RW-175 version of MicroFit tubing is suitable for use in space applications.
1.6 to 25.4 [0.063 to 1.000]	Standard: Translucent; Nonstandard: Black	MT1000 SCD; USP Class VI (Material)	N/A	Insulation and strain relief of medical device components exposed to high temperatures either during operation or sterilization. Thin-wall construction for applications with clearance constraints. Adhesive-lined version also provides sealing.
1.0 to 10.0 [0.040 to 0.400]	Standard: Black, clear; Nonstandard: White, red, blue, yellow, orange	MT2000 SCD; USP Class VI (Material)	N/A	Applications requiring lubricity, flexibility and excellent electrical insulation performance. A cost-effective alternative to FEP. Thin-wall construction is well suited for applications with clearance constraints. Adhesive lined version also provides sealing.
1.6 to 25.4 [0.063 to 1.000]	Standard: Black; Nonstandard: White	MT3000 SCD; USP Class VI (Material)	N/A	Insulation and strain relief of medical device components exposed to high temperatures either during operation or sterilization. Exceptional flexibility and thin-wall construction provide pliancy and small overall wire bundle or electrosurgical tool diameters.
1.6 to 25.4 [0.063 to 1.000]	Standard: Black, clear, blue; Nonstandard: White, red, yellow	MT5000 SCD; USP Class VI (Material)	N/A	Insulation of electrosurgical instruments. Protection against abrasion and fluids. Also used for strain relief, color coding and identification of medical components and devices.
3.2 to 101.6 [0.125 to 4.000]	Black	RT-510; UL/CSA	UL/CSA All Tubing Flame Test	Insulation, strain relief, and abrasion protection on cable harnesses and wire bundles in commercial electronics industries. Suitable for applications requiring some exposure to common fluids and solvents.
3.2 to 101.6 [0.125 to 4.000]	Black	RW-3030; AMS-DTL-23053/1, Cl. 1 & 2	AMS-DTL-23053 Test A	Insulation, strain relief, and abrasion protection on cable harnesses and wire bundles in the military and aerospace industries. Applications requiring exposure to fluids and solvents.
3.2 to 76.2 [0.125 to 3.000]	Black	RT-511; SC-X-15112; AMS 3623	ASTM D 2671 Procedure A	Harnessing applications for which fluid resistance, ruggedness, and flexibility at low temperatures are important. Applications requiring exposure to fluids and solvents at

Product Category	Product Name	Operating Temperature °C[°F]	Minimum Full Recovery Temperature °C[°F]	Shrink Ratio	Product Description	Features/Benefits
Special Purpose (contd)	PD Caps	-55 to 110 [-67 to 230]	135 [275]	3:1	Semirigid, encapsulant-lined polyolefin caps	End cap with meltable encapsulant inner wall for splash resistance. Permanent or temporary method to terminate wires.
	RayBlock 85	-40 to 85 [-40 to 185]	110 [230]	4:1	Heat-shrinkable water blocking system	Environmentally seals and provides strain relief to wire bundles of up to 20 wires. Withstands excursions to 105°C [221°F].
	RayBlock 105	-40 to 105 [-40 to 221]	110 [230]	4:1	High-temperature heat-shrinkable water blocking system	Environmentally seals and provides strain relief to wire bundles of up to 20 wires. Withstands excursions to 120°C [248°F].
	RNF-150	-55 to 150 [-67 to 302]	150 [302]	2:1	High-performance, flame-resistant, flexible fluoropolymer tubing	Thinner wall than most general purpose polyolefin tubings. Highly flame-resistant. Excellent physical and electrical properties after exposure to many chemicals and solvents at 50°C [122°F].
	RT-375	-55 to 150 [-67 to 302]	150 [302]	2:1	Clear, flame-resistant, flexible fluoropolymer tubing	Exceptional clarity and clarity stability. Highly flame-resistant. Toughness, chemical resistance, and high temperature performance.
	RT555	-65 to 200 [-85 to 392]	220 [428]	2:1	Fluid-resistant, chemical-resistant, fluoropolymer tubing with extended temperature range	Resistant to high temperatures, solvents, corrosive chemicals, hydrocarbons, and radiation. Highly flame-retardant. Low outgassing.
	RW-175	-55 to 175 [-67 to 347]	175 [347]	2:1	High-temperature, chemical-resistant polyvinylidene fluoride tubing	Tough, semirigid, very-thin-wall insulation. Highly flame-resistant. High temperature performance. Resistant to most solvents, fuels, and chemicals.
	SFR	-75 to 180 [-103 to 356]	175 [347]	1.75:1	Very flexible, flame-retardant, silicone elastomer tubing	Outstanding low-temperature flexibility. Resistance to hydraulic fluids, fuel, and lubricating oil. Very good ablative characteristics.
	TC Caps	-55 to 135 [-67 to 275]	135 [275]	2:1	Semirigid, flame-retardant polyolefin end caps	Single wall caps provide permanent or temporary insulation and termination. Vibration- and abrasion-resistant.
	Viton® fluoroelastomer	-40 to 200 [-40 to 392]	175 [347]	2:1	Chemical-resistant, high-temperature elastomeric tubing	Outstanding performance in severe chemical and thermal environments. High resistance to impact and abrasion.
	Viton®-HW fluoroelastomer	-40 to 200 [-40 to 392]	175 [347]	2:1	Heavy wall, chemical-resistant, high-temperature elastomeric tubing	Outstanding performance in severe chemical and thermal environments. Heavy wall provides increased protection against mechanical abuse.
	XFFR	-55 to 105 [-67 to 221]	121 [250]	3:1	Halogen-free, flame-retardant tubing	Halogen-free. Emits minimal amounts of toxic or acid gases during combustion.
	ZH-100	-30 to 105 [-22 to 221]	120 [248]	2:1	Flexible, thin wall, low-fire-hazard tubing	Low smoke emissions. Flexible, flame-retardant. No added halogens.
	ZHTM	-30 to 105 [-22 to 221]	121 [250]	2:1	Flexible, thick-wall tubing with low toxicity for fire safety applications	Low smoke emissions. Flexible, flame-retardant.

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Standard Size Range (Inside Diameter as supplied) MM [In.]	Colors	Applicable Specifications	Flammability Rating	Typical Applications
3.2 to 12.7 [0.125 to 0.500]	Black	PD Caps SCD; UL	N/A	Insulation and encapsulation of crimped electrical connections, especially stub splices, providing rugged protection against abrasion, vibration, and flexing.
12.0 to 32.0 [0.472 to 1.260]	Black	RayBlock 85 SCD; RW-2101	N/A	Sealing of cable bundles and the back of connectors.
12.0 to 32.0 [0.472 to 1.260]	Black	RayBlock 105 SCD; RW-2102	N/A	Sealing of cable bundles and the back of connectors.
1.2 to 25.4 [0.046 to 1.000]	Standard: Black; Nonstandard: White	RT-370; AMS-DTL-23053/18, Cl. 2; UL VW-1	AMS-DTL-23053 Test C; U: VW-1	Jacketing and bundling wires to form light-duty harnesses, especially where a low profile, abrasion resistance, and flexibility are needed. Insulation and strain relief of electrical connections and wire terminations.
1.2 to 50.8 [0.046 to 2.000]	Clear	RT-375; AMS-DTL-23053/18, Cl. 2; UL/CSA VW-1	AMS-DTL-23053 Test C; UL/CSA VW-1	Protection of components and wire markers subject to extreme abuse while permitting full identification and inspection.
3.18 to 50.80 [0.125 to 2.000]	Black	RT-555; AR70-75; UL	ASTM D 2671 Procedure C	Applications requiring resistance to high temperatures and resistance to a variety of chemicals and fluids. Insulation and strain relief on appliances. Protection of delicate electronic instruments.
1.2 to 38.1 [0.046 to 1.500]	Standard: Translucent; Nonstandard: Black	RW-3029/2; AMS-DTL-23053/8; UL/CSA VW-1	AMS-DTL-23053 Test C; UL/CSA VW-1	Insulation and strain relief of delicate electrical connections and terminations. Offers high temperature performance, outstanding abrasion and cut-through resistance, and superior chemical and solvent resistance.
6.4 to 50.8 [0.250 to 2.000]	Black	RT-1140; AMS-DTL-23053/10; MIL-PRF-46846, Type II, Cl. 1	AMS-DTL-23053 Test B	Cable harness protection where maximum flexibility in temperature extremes is required. Strain relief for electronic components, semi-conductor leads, and wire splices.
1.6 to 6.4 [0.063 to 0.250]	White, red and gray (One standard color per size)	TC Caps SCD; UL E85381	UL All Tubing Flame Test (Material)	Widely used for wire terminations because of light weight, small size, and durability.
3.2 to 50.8 [0.125 to 2.000]	Black	RT-1146; AMS-DTL-23053/13	AMS-DTL-23053 Test A; ASTM D 876	Insulation and protection of cables and components exposed to high temperatures and/or solvents, fuels, hydraulic fluids, lubricants, and acids. Suitable for use in engine compartments.
3.2 to 50.8 [0.125 to 2.000]	Black	RT-1145; MIL-PRF-46846, Type III, Cl. 1	ASTM D 876	Especially suitable for the most demanding harnessing requirements in aircraft, missiles, satellite systems, and chemical plants.
7.62 to 76.20 [0.300 to 3.000]	Black	RW-2016; MIL-C-24643 (Cable jacket performance); NES 713; NES 711; ABS	MIL-C-24643	Harnessing, rejacketing and repair of cables in enclosed areas requiring a halogen-free, flame-retardant environment.
3.2 to 51.0 [0.125 to 2.000]	Standard: Black Nonstandard: White, red, blue, yellow, green	RW-2031	ASTM D 876	Jacketing wire bundles and light-duty harnesses for use in areas where low-fire-hazard materials are required.
3.0 to 50.0 [0.118 to 1.969]	Black	RW-2058	ASTM D 2671, Procedure B (Sizes 12/6 & below); ASTM D 876 (Sizes 18/9 and larger)	Insulation and protection of cables, harnesses, and electrical and electronic components in enclosed spaces, such as in ships, mass transit systems and offshore installations.

Raychem Tubing Specification Cross-Reference Guide

Product Type	UL file	CSA file	AMS-DTL-23053* Sheet	AMS-DTL-23053* Class	MIL-PRF-46846 Type	MIL-PRF-46846 Class	Raychem Specification
ATUM	E85381**		/4	3			RW-2063 (Black), RK-6024 (Colors & Clear)
BSTS							RW-2017
BSTS-FR			/15	1 & 2***			RW-2017
CGPE-105							CGPE-105 SCD
CRN Type 1 (Black)	E35586	LR31929†	/6	1			RT-360, Type 1
CRN Type 2 (Clear)			/6	2			RT-360, Type 2
DCPT	E35586	LR31929					RW-2056
DR-25			/16				RT-1116
DWP-125	E35586	LR31929	/4****	3			DWP-125 SCD
ES1000	E85381						RT-1113
ES2000	E85381						RT-1112
ES Caps	E85381						RW-3006
FL2500							FL2500 SCD
HCTE							RT-1162
HF			/15	1***			RW-2023
HFT5000	E199379						RW-2060
HRSR							RW-2013
HRNF							RW-2013
HRHF							RW-2013
HTAT							RW-2052
MFT-MT1000							Altera MicroFit SCD
MFT-MT2000							Altera MicroFit SCD
MFT-RW-175							RW-175 MicroFit SCD
MT1000***							MT1000 SCD
MT2000***							MT2000 SCD
MT3000							MT3000 SCD
MT5000***							MT5000 SCD
NT	E35586	LR31929					RT-510
NT-MIL			/1	1 & 2			RW-3030
NTFR							RT-511
PD Caps	E85381						PD Caps SCD
RayBlock 85							RW-2101
RayBlock 105							RW-2102
RHW	E115664						RHW SCD
RMW							RMW SCD
RNF-100 Type 1(Colors)	E35586	LR31929	/5	1			RT-350, Type 1
RNF-100 Type 2(Clear)			/5	2			RT-350, Type 2
RNF-150	E35586 VW-1		/18	2			RT-370
RNF-3000	E35586	LR31929					RW-2053
RP-4800	E35586		/5	1††			RT-1122
RT-3	E35586	LR31929†					RT-360†††
RT-375	E35586 VW-1	LR31929 VW-1	/18	2			RT-375
RT555	E85381						RT-555
RW-175	E35586 VW-1	LR31929 VW-1	/8				RW-3029/2
SCL	E85381		/4	1			RT-1301
SCT							SCT SCD
SFR			/10		II	1	RT-1140
SST							RW-2011
SST-FR			/15	1 & 2			RW-2011
TAT-125 Type 1 (Colors)	E85381		/4	2			RW-3032
TAT-125 Type 2 (Clear)							TAT-125 SCD
TC Caps	E85381						TC Caps SCD
Versafit	E35586 VW-1	LR31929 VW-1	/5	1 & 3			RW-3009
Versafit V2	E35586 VW-1	LR31929 VW-1					RW-3023
Versafit V4	E85381 VW-1	LR31929 VW-1					RW-3023
Viton®			/13				RT-1146
Viton®-HW					III	1	RT-1145
XFFR							RW-2016
ZH-100							RW-2031
ZHTM							RW-2058

*Formerly MIL-I-23053 and MIL-DTL-23053 **Black only, except sizes 3/1 and 4/1 ***Without adhesive ****Meets the material properties of AMS-DTL-23053/4, Cl. 3 except for sealing efficiency †Black only ††Overexpanded †††With exception to dimensions and longitudinal change.

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Heat-Shrinkable Tubing Selection Guide