



GMT-221M - Medical Flexible Polyolefin, Milspec Qualified, Flame Retardant Shrink Tube



GMT-221M Applications:

- General Purpose Insulation & Repair
- Wire & Cable Harnessing & Bundling
- Cable & Connector Protection
- Spools Used in Automatic Cutting Machine

SHRINK RATIO 2:1
SAE-AMS-DTL-23053/5A
CLASS 1, 2 (Clear) & 3
RoHS
UL CERTIFIED
E306685 cUL CERTIFIED
VW-1 FLAME TEST

Flexible Polyolefin, Milspec Qualified Flame Retardant, Versatile Uses GMT-221M is a heat shrink designed specifically for the medical industry, (hence the “M”). GMT-221M provides optimal insulation for cable assemblies, wire harnesses, and wire connections. It is designed to provide resistance to abrasion, thermal heat, and fluids in demanding environments. It provides excellent protection for wire bundles and may be used for wire identification. JP-8 Fuel resistance and hydraulic fluid resistance.

Characteristics

- Shrink Ratio 2:1
- Operating Temperature: -45° to 135° Celsius
- Shrink Temperature: 90° – 100° Celsius
- Flame Retardant (Except Clear), UL Standard 224
- Environmentally Friendly



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Specifications						
Gamma Part No. W/ Size	Minimum Expanded as Supplied		Maximum Recovered After Heating		Recovered Thickness After Heating	
	mm	inch	mm	inch	mm	inch
GMT-221M(S/4ft)-3/64"-(X)	1.2	0.046	0.60	0.023	0.40 ±0.08	0.016 ± 0.003
GMT-221M(S/4ft)-1/16"-(X)	1.6	0.063	0.80	0.031	0.43 ±0.08	0.017 ± 0.003
GMT-221M(S/4ft)-3/32"-(X)	2.4	0.093	1.20	0.046	0.51 ±0.08	0.020 ± 0.003
GMT-221M(S/4ft)-1/8"-(X)	3.2	0.125	1.60	0.062	0.51 ±0.08	0.020 ± 0.003
GMT-221M(S/4ft)-3/16"-(X)	4.8	0.250	2.40	0.093	0.51 ±0.08	0.020 ± 0.003
GMT-221M(S/4ft)-1/4"-(X)	6.4	0.375	3.20	0.125	0.64 ±0.08	0.025 ± 0.003
GMT-221M(S/4ft)-3/8"-(X)	9.5	0.375	4.80	0.187	0.64 ±0.08	0.025 ± 0.003
GMT-221M(S/4ft)-1/2"-(X)	12.7	0.500	6.40	0.25	0.64 ±0.08	0.025 ± 0.003
GMT-221M(S/4ft)-3/4"-(X)	19.1	0.750	9.50	0.375	0.76 ±0.08	0.030 ± 0.003
GMT-221M(S/4ft)-1"-(X)	25.4	1.000	12.70	0.5	0.89 ±0.12	0.035 ± 0.005
GMT-221M(S/4ft)-1-1/4"-(X)	31.8	1.250	15.90	0.625	1.02 ±0.15	0.040 ± 0.006
GMT-221M(S/4ft)-1-1/2"-(X)	38.1	1.500	19.10	0.75	1.02 ±0.15	0.040 ± 0.006
GMT-221M(S/4ft)-2"-(X)	50.8	2.000	25.40	1	1.14 ±0.16	0.045±0.007

Color Code: 0=BLK, 1=BRN, 2=RED, 3=ORN, 4=YLW, 5=GRN, 6=BLU, 7=VIO, 8=GRY, 9=WHT, X=CLR

Properties

Category	Characteristic	Test Requirement	Test Procedure / Condition	Test Result
A. Sleeving Properties as supplied	1. Inner Diameter	WS Sample ≥ .125"	4.6.3.1.1 of M/23053/5E	≥ .125"
		WM Sample ≥ .375"	4.6.3.1.1 of M/23053/5E	≥ .375"
	2. Heat Shock	4 Hrs @ 250C	4.6.8 of M/23053/5E	No Crack, Flow or drip
		360° bend at 3 seconds	4.6.8 of M/23053/5E	No Crack
	3. Secant Modulus	< 25,000 PSI	ASTM D 882 & 23053/5E 4.6.12.1	Two Sample Avg < 25,000 PSI
	4. Concentricity	>70%	ASTM D 2671 & 23053/5E 4.6.3.3	Sample A & B > 70%
	5. Color Stability	175°C @ 24 Hrs	4.6.15 of M/23053/5E	Slight Darkening, but no Discoloration
6. Restricted Shrinkage	175°C @ 30 min.	4.6.6 of M/23053/5E	No Cracking	
7. Voltage Withstand	2000 V @ 1 Min	ASTM D 149 & 4.6.6.2 of M/23053/5E	No Flashover or Punctures	
B. Sleeving Properties after Unrestricted Shrinkage	1. Inner Diameter - Sample A	200 C @ 3 minutes	4.6.5 of M/23053/5E	WS Sample ID Before Rec. > .185", After Rec. = .062"



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	2. Inner Diameter - Sample B	200 C @ 3 minutes	4.6.5 of M/23053/5E	WM Sample ID Before Rec. > .375", After Rec. = .187"
	2. Wall Thickness	After Unrestricted Shrinkage	4.6.3.2 of M/23053E	WS Sample WT = .2"
		After Unrestricted Shrinkage	4.6.3.2 of M/23053E	WM Sample WT = .28"
	3. Tensile Properties	Min of 1500 PSI	ASTM D 638 & 4.6.13 of M/23053E	AVG > 1500 PSI
	4. Dielectric Strength	Min of 500	ASTM 2671 & ASTM D 149	WS Sample > 500 PSI
		Min of 500	ASTM 2671 & ASTM D 149	WM Sample > 500 PSI
	5. Volume Resistivity	Min of 10 ¹⁴	ASTM D 257 & ASTM D 876	>10 ¹⁴
	6. Specific Gravity	Max of 1.35	ASTM D 792	≤1.35
	7. Water Absorption	Max of .05%	ASTM D 570 24 Hr immersion	<.05%
	8. Corrosion	175°C @ 16 Hrs	4.6.10.1 of M/23053E	No Pitting or Blacking
	9. Low temperature Flexibility	Negative 55°C for 4 hrs	4.6.7.1 of M/23053/5E	No Cracking
	10. Flammability	Self Extinguishing within one minute and no more than 25% or Indicator Flag Burned or Charred	ASTM D 2671 & 4.16.14 of M/23053/5E	<25% Char, Self Extinguish within one minute, no drip or flow
C. Unrestricted Shrinkage Sleeving after shrinkage	1. Heat Resistance	175°C @ 168 Hrs	ASTM D 638 & 4.6.13 of M/23053/5E	>100%
	2. Fluid Resistance	See Table 2		

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Table 2.

Condition	Property	Sample WM	Sample BM	Requirement
Initial	Tensile Strength, PSI	1721 (41)	1575 (92)	1,500 min
	Ultimate Elongation, %	487 (17)	442 (42)	200 min
Pass / Fail		Pass	Pass	Pass
Heat Aged (*3)	Ultimate Elongation, %	415 (28)	439 (24)	100 Min
Pass / Fail		Pass	Pass	Pass
MIL-H-5606 (*4)	Tensile Strength, psi	1090 (34)	1143 (30)	1,000 min
Pass / Fail		Pass	Pass	Pass
MIL-A-8243 (*4)	Tensile Strength, PSI	1090 (34)	1143 (30)	1,000 min
Pass / Fail		Pass	Pass	Pass
MIL-L-7808 (*4)	Tensile Strength, PSI	1,679 (92)	1,714 (57)	1,000 min
Pass / Fail		Pass	Pass	Pass
MIL-23699 (*4)	Tensile Strength, PSI	1,782 (102)	1840 (57)	1,000 min
Pass / Fail		Pass	Pass	Pass
JP-8 (*4)	Tensile Strength, PSI	1260 (61)	1069 (195)	1,000 min
Pass / Fail		Pass	Pass	Pass
5% NaCL (*4)	Tensile Strength, PSI	1845 (84)	1,862 (75)	1,000 min

Notes

*3 -- Aged in laboratory oven for 168 hours at a nominal 175°C

*4 -- Aged in the corresponding fluid for 24 hrs at ambient laboratory conditions. Specimens were wiped off and allowed to rest for 45 (± 15) minutes prior to evaluation.

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