



Sheldahl T9013

Medium-Flow Flame Retardant Adhesive on PEN Film

Description

T9013 tapes join Sheldahl’s medium flow adhesive with PEN film and are designed for dielectric applications such as flexible ribbon cables, coverlays, and buss-bars. The material’s superior dimensional stability, chemical resistance, dynamic flexibility, and high temperature tolerance provide end-users with solutions that are unattainable with other products.

- Controlled flow adhesive makes T9013 ideal for use in bulk cable applications
- High bond strength provides superior adhesion to copper, tin, and standard FFC/FPC materials
- Low variation in adhesive thickness ($\pm .1$ mil) simplifies production
- Elimination of post bake shortens production time, cuts costs, prevents copper oxidation, and eliminates a major cause of dimensional change
- Finished products have a UL minimum continuous use temperature rating of 105°C
- Cables made with T9013 withstand >1000 hours of hydrolysis testing
- T9013 is a registered UL 94 VTM-0 (E39696)

Processing Recommendations

Roll-to-Roll Laminating

	SAE	Metric
Hot roll temperature	305 - 370°F	150 – 185°C
Pressure (minimum)	190 PSI	13 bar
Line speed	10-25 FPM	3-8 M/min.
Exit temperature	300°F (2.5 in. from nip point)	150°C (6cm from nip point)

Platen Press

Platen temperature	275-300°F	135-160°C
Pressure	100-200 PSI	7-14 bar
Time (cool under pressure)	10 min to 120°F	10 min to 50°C

**Please note, actual values will depend on many factors including but not limited to: number of rollers, number of heated rollers, copper thickness and cable pitch, wrap angle of tape on heated rollers prior to lamination, run speed, etc. Sheldahl suggests use of standard industry tests to confirm encapsulation and adhesion quality. Post curing of finished cables is not needed to achieve temperature resistance. Contact Sheldahl for assistance enhancing product performance.*

PROPERTY	Test Method	TYPICAL DATA ^A
Dimensional Stability, (maximum, %)	IPC-TM-650, Method 2.2.4	0 ± .20
Peel Strength, minimum, (lb./in. – width)	IPC-TM-650, Method 2.4.9	10.0
Flow, maximum, (mils)	IPC-TM-650, Method 2.3.17.1	2 ^(B)
Volatile Content (maximum %)	IPC-TM-650, Method 2.3.37	1.5
Chemical Resistance	IPC-TM-650, Method 2.3.2	90% ^(D)
Dielectric Constant, maximum (at 1MHz)	IPC-TM-650, Method 2.5.5.3	3.4 ^(E)
Dissipation Factor, maximum (at 1 GHz)	IPC-TM-650, Method 2.5.5.3	0.005 ^(E)
Volume Resistivity, (minimum ohm-cm)	IPC-TM-650, Method 2.5.17	1 x 10 ¹⁶ ^(E)
Surface Resistance, (minimum, ohms/sq.)	IPC-TM-650, Method 2.5.17	1 x 10 ¹⁵ ^(E)
Dielectric Strength, (minimum volts/mil)	ASTM-D-149	5000 ^(E)
Fungus Resistance	IPC-TM-660, Method 2.6.1	Non-Nutrient
Moisture Absorption, (maximum %)	IPC-TM-650, Method 2.6.2	0.5
Flammability	UL 94VTM-0	PASS ^(C)
Specific Gravity		1.68
Glass Transition Temperature		20°C
Adhesive Tack Temperature	Clarkston Bar	190 – 200°F
Tensile Strength, (minimum lb./in. ²)	ASTM-D-882	32,000
Tensile Modulus, (psi)	ASTM-D-882	870,000
Elongation, (minimum %)	ASTM-D-882	60
Initiation Tear Strength, (gms/mil)	IPC-TM-650, 2.4.16, Method A	800 ^(E)
(A) Sheldahl does not guarantee, nor will it accept obligation or liability based on the use of this data. Data subject to change without notice.		
(B) Based on 1.5 mil adhesive.		
(C) Based on standard constructions using flame retardant adhesives, consult factory for data on specific constructions.		
(D) Except chlorinated solvents and ketones.		
(E) Based on Film alone at 1 mil thickness.		

Storage and Shelf Life

Guaranteed shelf life is six months from date of shipment when stored at ≤20°C and ≤50% RH.