Tyco Electronics Corporation
305 Constitutional Drive
Menlo Park, CA 94025 USA

Specification: **RT-1050/29**
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RAYCHEM BRAND® ADHESIVE
Raychem S-1260

1. SCOPE

Thermofit S-1260 is an environmentally resistant modified fluoropolymer designed to provide sealing in high temperature systems including power cable with fluoropolymer and fluoroelastomer insulators that can be installed on an aircraft and sustain the cables properties. The adhesive is also used for high temperature harness systems. The adhesive is non-oven curable and is utilized in high temperature applications. It is supplied in a clear tape form (approximately 25' x 3/4" x 0.013±0.003" rolls) and a blue sheet component material (approximately 250' x 9" x 0.013±0.003" rolls).

2. APPLICABLE DOCUMENTS

The specifications and standards listed in Table I under "Method of Test" shall form a part of this specification to the extent specified herein.

3. REQUIREMENTS

The adhesive shall meet the requirements of Table I.

TABLE 1

PROPERTY	UNIT	REQUIREMENT	METHOD OF TEST
PHYSICAL			
Visual		Pass	Section 4.3.1.1
Specific Gravity		2.00 ± .05	Section 4.3.1.2 ASTM D 792
Low Temperature Flexibility	ºC	No cracking	4.3.1.6
4 hours at -55° C (*-67°F*)			ASTM D 1146; Note
Blocking Cohesive @ 65° C (*149°F*)		Free to first degree	1
1 X 3 inch tape specimens			
1 pound weight			
Adhesive T-Peel (tube size 1-1/4")			
RT-555 to RT-555	Pound in width	15 Minimum	4.3.1.9
RW-200 to RW-200	Pound in width	15 Minimum	
[-55] to RT-555	Pound in width	15 Minimum	
[-12] to RW-200	Pound in width	15 Minimum	
Adhesive Drum Peel (tube size 1-1/4")	Pound in width	15 Minimum	
RT-555 to Aluminum	Pound in width	15 Minimum	
RW-200 to Aluminum	Pound in width	15 Minimum	
RT-555 to Steel	Pound in width	15 Minimum	
RW-200 to Steel			

TABLE 1 (CONTINUED)

PROPERTY	UNIT	REQUIREMENT	METHOD OF TEST
CHEMICAL			
Water Absorption, 24 hours at 23° C 1 X 3 inch tape specimens	Percent	0.5 maximum	Section 4.3.2.1 ASTM D 570
Corrosive Effect Copper Mirror 16 hours at 200° C *(392° F)*		Non-Corrosive	Section 4.3.2.2 ASTM D 2671 Method B
Fungus Resistance 1 X 2 inch tape specimens		Rating of 1 or less	Section 4.3.2.5 ASTM G 21
Solvent and Fluid Resistance 24 hours at 23° C (*73° F*) 1 X 3 inch tape specimens			4.3.2.6 ASTM D 543 Note 3
Cleaning Compound (AA59133)	percent	0.5 maximum	
JP-5 Fuel (MIL-T-5624)	percent	0.5 maximum	
Hydraulic Fluid (87257)	percent	0.5 maximum	
Lube Oil (Mil-L-7808)	percent	0.5 maximum	
Lube Oil (Mil-L-23699)	percent	0.5 maximum	
ASTM Reference Fuel B	percent	0.5 maximum	
Skydrol LD-4	percent	0.5 maximum	
ELECTRICAL			
Volume Resistivity 6 X 6 X 0.015-inch specimen	ohm-cm	10^{12} min	Section 4.3.3.1 ASTM D 257
Dielectric Strength 6 X 6 X 0.015-inch specimen	volts/mil	500 min	Section 4.3.3.2 ASTM D 149

Acceptance Tests: Visual inspection, Dimensional inspection (per drawing S1260 Tape).
Adhesive T peel strength: RT-555 tubing material to RT-555 tubing material at 23℃ (per section 4.3.1.9, B)

4. QUALITY ASSURANCE PROVISION

4.1 CLASSIFICATION OF TESTS

4.1.1 Qualification Tests

Qualification tests are those performed on samples submitted for qualification as satisfactory products and shall consist of all tests listed in this specification. Clear material qualifies all colors.

4.1.2 Acceptance Tests

Acceptance tests are those performed on each production lot of adhesive.
Acceptance tests shall consist of the following:
Visual inspection.
Dimensional inspection (per drawing S1260 Tape).
Adhesive peel strength: [-55] material to RT-555 at 23℃

4.2 SAMPLING INSTRUCTIONS

4. 2.1 Qualification Test Samples

Sufficient adhesive shall be prepared to satisfy all the test requirements listed in Table 1.

4 .2.2 Acceptance Test Samples

Acceptance test samples shall be taken from each lot of material. A lot shall consist of all the adhesive from the same production run offered for inspection at the same time.
The acceptance test should include: Visual inspection, Dimensional inspection (per drawing S1260 Tape) and Adhesive T peel strength: RT-555 tubing material to RT-555 tubing material at 23℃ (Per section 4.3.1.9, B)

4.3 TEST PROCEDURES

4.3.1 PHYSICAL

4.3.1.1 Visual Examination

The adhesive tape shall be visually examined to insure that the material is homogeneous and free of foreign particles or other contaminants.

4.3.1.2 Specific Gravity

The specific gravity shall be determined in accordance with ASTM D 792. The reported result is the average of three test specimens.

4.3.1.3 Low Temperature Flexibility

Cut 3 strips, 1/4" x 6", from a length of S-1260 tape. Place the strips and a 1" diameter mandrel in a -55 ± 2°C cold chamber for 4 hours. While still in the chamber wrap the strips 360° around the mandrel in approximately 2 seconds. The reported result is the average of three test specimens.

4.3.1.4 Adhesive Peel

Peel strength shall be determined using an uncoated RT-555 & RW-200 sleeve recovered and adhered to a mandrel approximately 1 inch in diameter. Mandrel material shall be aluminum or steel pipe or other specified materials. The mandrel materials with each respective surface preparation and bonding techniques are described in paragraph 100 of ASTM D 2671-09.

A) Substrates

Modified Fluoroelastomer	RW-200
Fluoropolymer	RT-555
Aluminum	2024-T3 or equivalent
Steel	ASA-B36.10-1939
Modified Fluoropolymer	[-55]
Crosslink Fluoroelastomer	[-12]

B) Heat Shrinkable Tubing to Heat Shrinkable Tubing

Recover a 6-inch length of the specified heat shrinkable tubing on a metal tube 1 inch in diameter. Apply heat with a CV-1983 gun and the TG-23 reflector operating at 300 – 312 °C *(572 to 594°F)*. Cool the recovered tubing to room temperature. After cooling, lightly abrade the outside of the recovered tubing and the insides of three 1-1/2 inch lengths of the specified 1-1/4 inch diameter (for RW-200 and RT-555) expanded tubing with No. 320 emery cloth. Wipe with a clean cloth or paper towel wet with isopropyl alcohol and allow sufficient time to dry. Spiral wrap with 50% overlap of adhesive tape onto tubing. Place a strip of 3/4-inch-wide masking tape lengthwise over the adhesive tape to hold it in place and to provide unbounded ends to insert into tensile tester. (Figure A).

Place three 1-1/2 inch lengths of the tubing, abraded and cleaned on the inside, over the adhesive, as shown in Figure A, and recover as described above. Continue heating for 4 minutes after the tubing has fully recovered. Cool to room temperature for 24 hours, and cut along one edge of the masking tape to remove the bonded assembly from the mandrel (Figure B). Cut a specimen 1 inch wide (Figure C) from the center of each double thickness.

Insert the unbonded ends of each specimen in the jaws of a tensile tester operating at a jaw separation speed of 2 inches per minute. Make readings of the T peel strength at every 1/2 inch of jaw separation after 1 inch initial separation. The average of five readings shall define T peel strength.

Note: Use a 6 inch long, 1 inch diameter aluminum pipe mandrel to avoid a large heat sink during installation.

C) Heat Shrinkable Tubing to Aluminum and Steel

Abrade a 6-inch length of 1-inch diameter aluminum pipe (2024 T-3 or equivalent) or steel pipe, (ASA-B36.10-1939 or equivalent) with No. 320 emery cloth and wipe with a clean cloth or paper towel wet with isopropyl alcohol. Spiral wrap the adhesive tape on the pipe, with a 50% overlap to produce a double thickness of adhesive. Place a strip of 3/4-inch-wide masking tape lengthwise over the adhesive to hold it in place and to provide unbounded ends to insert into tensile tester. (Figure D)

Abrade, clean and recover three 1-1/2-inch lengths of 1-1/2 inch diameter

RW-200 or RT-555 as described in Section B above. Cool to room temperature for 24 hours, and cut tubing into 1-inch wide sections (Figure D). Cut each specimen along the edge of the masking tape to free unbounded ends of the tubing.

Place the specimen in a tensile testing machine, with the specimen around the positioning mandrel and the free end of the specimen inserted into the tensile testing machine jaw.

(Figure E) Construct the holding fixture so that the yoke is free to rotate during testing. Test with a jaw-separation speed of 2 inches per minute. Take readings of peel strength at every 1/2 inch of jaw separation after 1 inch initial separation. The average of five readings shall define peel strength.

D) Heat Shrinkable Tubing to Heat Shrinkable Boot

Recover a 6-inch length of the specified heat shrinkable tubing on a metal tube 1 inch in diameter. Apply heat with a CV-1983 gun and the TG-23 reflector operating at 300 – 312 °C *(572 to 594°F)*. Cool the recovered tubing to room temperature. After cooling, lightly abrade the outside of the recovered tubing and the insides of the specified (-12) or (-55) boot with No. 320 emery cloth. Wipe with a clean cloth or paper towel wet with isopropyl alcohol and allow sufficient time to dry. Spiral wrap with 50% overlap of adhesive tape onto tubing. Place a strip of 3/4-inch-wide masking tape lengthwise over the adhesive tape to hold it in place and to provide unbounded ends to insert into tensile tester. (Figure A).

Insert the (-12) or (-55) boot over the adhesive and recover as described above. Continue heating for 4 minutes after the boot has fully recovered. Cool to room temperature for 24 hours, and cut along one edge of the masking tape to remove the bonded assembly from the mandrel. Cut a specimen 1 inch wide of each double thickness.

Insert the unbonded ends of each specimen in the jaws of a tensile tester operating at a jaw separation speed of 2 inches per minute. Make readings of peel strength at every 1/2 inch of jaw separation after 1 inch initial separation. The average of five readings shall define peel strength. Note: Use a 6 inch long, 1 inch diameter aluminum pipe mandrel to avoid a large heat sink during installation.

4.3.2 CHEMICAL

4.3.2.1 Water Absorption

The water absorption shall be determined in accordance with ASTM D 570. The samples shall be immersed 24 hours at 25 ± 3 C (77 ± 5 F). The reported result is the average of three test specimens.

4.3.2.2 Corrosive Effect

Test three 1" x ¼" (25.4x6.3mm) specimens cut from adhesive tape for corrosive effect in accordance with ASTM D 2671, Procedure A. Test the specimens for 16 hours at 200° ±3°C (392 ± 5°F) and evaluate the percentage of Copper removed on the Copper mirror. The reported result is the average of three test specimens.

4.3.2.3 Fungus Resistance

The fungus resistance of the adhesive and sealant shall be determined in accordance with ASTM G-21. The specimen size shall be 2 x 2 x .075 inch and shall be exposed for a period of 28 days. The reported result is the average of three test specimens.

4.3.2.4 Solvent/Fluid Resistance

Immerse three weighed specimens in each of the fluids specified. The volume of the fluids shall be not less than 20 times that of the specimens. After the immersion, lightly wipe the specimens and air dry for 30 to 60 minutes at room temperature. Reweigh the specimens and calculate the percent weight uptake. The reported result is the average of three test specimens.

4.3.3 ELECTRICAL

4.3.3.1 Volume Resistivity

The volume resistivity shall be determined in accordance with ASTM D 257. The specimen as described in paragraph 4.2.1.1, shall be prepared using silver-paint electrodes. The reported result is the average of three test specimens.

4.3.3.2 Dielectric Strength

The dielectric strength shall be determined in accordance with ASTM D 149. Measurements shall be made under oil using 1 inch electrodes on a 6 x 6 x .075 inch sheet specimen prepared according to paragraph 4.2.1.1. The rate of rise shall be 500 volts per second. Thickness measurements shall be made at the point of breakdown for the purpose of calculating dielectric strength. The reported result is the average of five test specimens.

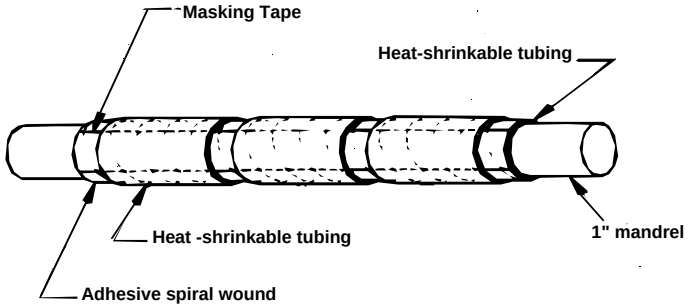

Figure A. Mandrel Assembly

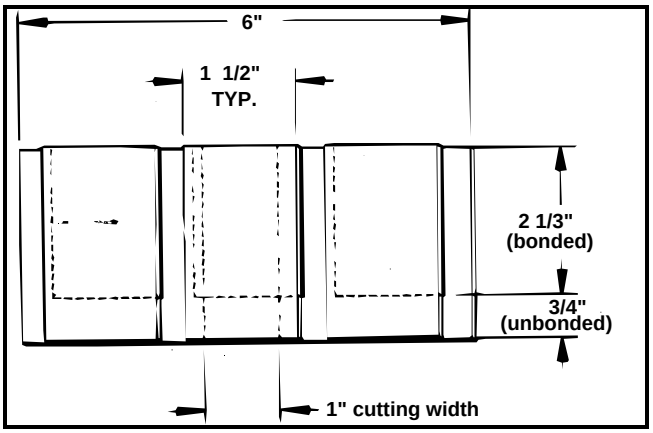

Figure B. Slab Specimen

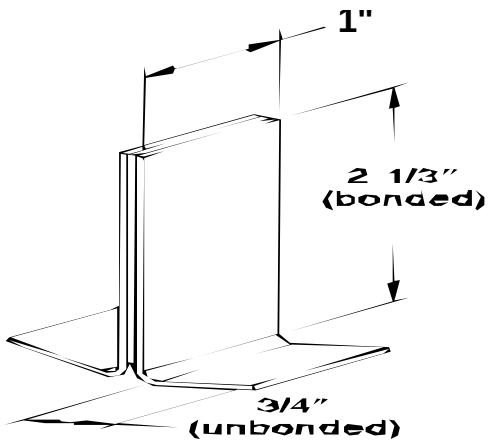

Figure C. Peel Strength Specimen

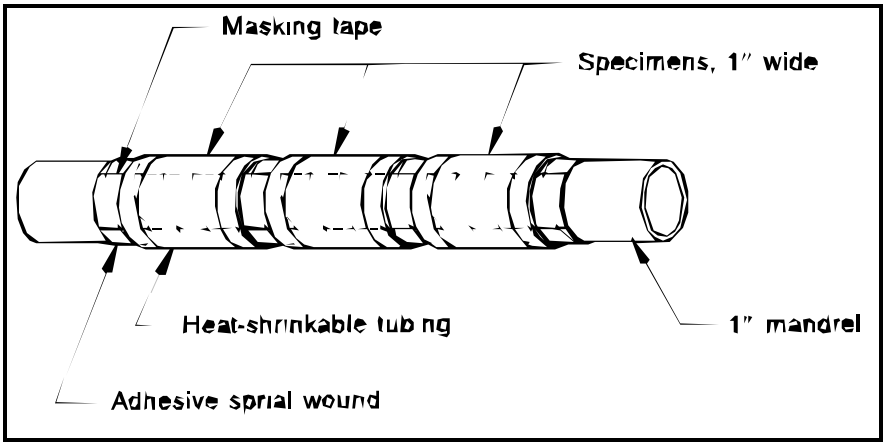

Figure D. Peel Specimen Preparation

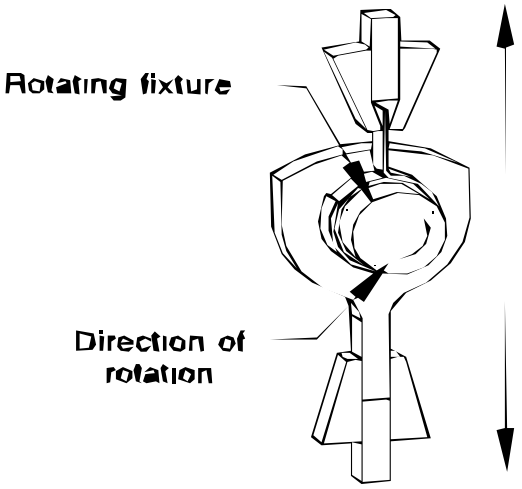

Figure E. Peel Specimen in Tensile Test