

***T&B Self-Fusing
Insulation Tape*** 

Thomas&Betts



Product Background:

I. Electrical Tape purpose

T&B Self-Fusing Insulation tape primarily functions as a flexible, dielectric layer which may be installed to insulate conductors, splices or other exposed electrical connections or terminations. It may also function to provide a physical barrier to adverse environmental elements, such as humidity, moisture, corrosive chemicals, etc. A secondary function of the tape is to provide mechanical protection against abrasion, although most existing tapes on the market typically accomplish this abrasion resistance and physical protection utilizing a multi-tape system rather than a single tape.

II. Electrical Tape properties

There are several physical properties typically used to define the characteristics of an electrical tape. They are : Tensile Strength, Elongation, Dielectric strength, Tack/Fusion, Water Absorption.

III. Other properties/Human Factors/Convenience

There are additional properties or characteristics that are considered when selecting a tape or splice kit. They are : ease of application, ease of removal, abrasion/tear resistance, ease of liner removal (if applicable), storage requirements, operating temperature range, ozone resistance and track resistance. In addition, our T&B smooth insulating putty is the only such product on the market that can be used to fill voids and cavities quickly without wasting time filling the cavity with many wraps of tape.

IV. Differences between standard products

There are various manufacturers and types of products on the market today, most of which were formulated with specific applications in mind. One of the first advantages of T&B's Self-Fusion Tape is that it is formulated with generic usage in mind. The T&B Self-Fusion Tape product line has excellent characteristics in all areas. It is ozone and track resistant. It can take continuous high and low temperatures (-90°C to + 260°C) without affecting its ability to fuse or insulate or seal. Its tensile strength is higher than all existing silicone based products (1200PSI) other than glass impregnated tapes (a process that increases cost). Its minimum dielectric strength is above all other tapes we know of (400VPM). The 20 mil Self-Fusion Tape has fast fusing time. Its water adsorption is (<0.5%). In addition to these physically measured and tested characteristics, other characteristics that make T&B

T&B Self-Fusing Insulation Tape



Self-Fusion Tape easy to use include : 1. The liner which prevents the tape from fusing to itself is easy to remove and does not have extreme sensitivity to static as most products. 2. Ease of application : The tape is easy to apply, it molds into any irregular surfaces, and it has no sticky/tacky surface to deal with when applying. 3. T&B Self-Fusion Tape can be stored under any conditions (i.e. in your tool box, in your trunk, etc.) not just in a cool dry place, and its fusion will work under any environmental conditions. 4. For industrial applications (i.e. power plants, factories, etc.), the T&B Self-Fusion Tape liner is black rather than clear, making it easy to identify and remove after performing a job (it won't get left on the ground because of being clear). 5. Ease of removal: If T&B Self-Fusion Tape needs to be removed, just cut/slice it with a knife or scissor and it comes right off leaving no residue. 6. Abrasion/Tear resistance : Even though Fusion Tape products can be easily removed, it also has a good abrasion and tear resistance such that it can withstand abrasion without splitting, tearing and propagating; thus making it a one tape product. There is no need to apply a glass tape, an insulating tape and then a jacketing tape. You don't have to apply a glue or adhesive. Unlike heat shrink, no shim is necessary. Fusion Tape eliminates the need for a heat gun and you don't have to get a specific kit for a certain size or configuration of splice. One product covers it all.

Product Characteristics Comparisons

The following are some general comparison of characteristics of similar products and their importance.

A. Tensile Strength

Standard black electrical tapes have a low tensile strength (such as 3m Scotch 33 – vinyl tape, or 3m Scotch 130C – EPR tape) and therefore have a high elongation (they can be stretched many times the original length). These types of tapes are very low cost and are good general use products, but they will not make an effective water tight seal under high humidity, rain or submergence. This inability to seal, is due to the fact that they can not be pulled tightly to create tension over the surface onto which they are wrapped and that they have a low tensile strength and high elongation. These types of tapes typically rely on their adhesive properties to stick to a surface; however, this adhesive is typically sensitive to humidity and temperature and as such, is not effective over a wide temperature range. T&B Self-Fusion Tapes provide their environmental seal by compression. In other words, they are initially pulled as tightly as possible so that a compressive seal is created. This seal does not depend on the surface or on any adhesive properties; therefore, there is no concern over chemical compatibility, cleanliness or surface conditions. Other silicone based competitors typically have a tensile strength in the range of 700 to 800.



B. Abrasion resistance/Tear Resistance

Vinyl and EPR (ethylene propylene rubber) tapes and other products on the market such as heat shrink and cold shrink made from cross linked polyethylene are very tough and highly resistant to abrasion or tear; however, these products are very difficult to remove. Most vinyl (standard black household electrical tape) and EPR (Scotch 130C, etc.) become gummy or soft over time and are sticky and messy to remove. Heat shrink tubing requires cutting and heating, then cleaning to remove the adhesive. These tapes also require cleaning due to their adhesive and gummy characteristics. All Silicone based tapes are easy to remove however, some are extremely sensitive to abrasion or nicks and will split open or come off if scored in any way. This is why the manufacturers of these products recommend using jacketing. All competitive products that we know about are this way. Not T&B Self-Fusing Insulation Tape, due to its unique formulation and manufacturing process, it is resistant to abrasion and also split propagation. Most competitors products that are silicone based have an abrasion tear resistance of 80 to 90 lbs/in which indicates poor resistance. A high abrasive / tear resistance tape (such as vinyl/EPR) would have a tear resistance of 130 to 140. T&B Self-Fusion Tape has a tear resistance of > 110lbs/in, yet it still is easy to cut off and remove quickly while leaving no residue. It is impossible to have both excellent abrasion resistance and be as easy to remove. We at Thomas & Betts believe that T&B Self-Fusion Tape is the perfect mix of these properties and therefore can be used as a stand alone product, requiring no protective jacketing tape over it.

C. Fusion/Tack

Both 20 mil and 40 mil tapes are self-fusing or self-amalgamating tapes. Most products similar to this require a period of time (1 to 24 hours) in order to become a homogeneous/sold mass of rubber. Both tapes are the fastest fusing products that we know of, on the market. This becomes an important factor when splicing or protecting a connection that is subject to high humidity or even submergence. In the case of the 20 mil tape, it's fast fusion is critical to its ability to seal a pressurized hose or pipe in that you can apply pressure to a pipe or hose immediately after wrapping. This pressure will not push between the "fusing layers" because the fusion action takes place so quickly. In the case of T&B Self-Fusion Tape and an electrical connection, a splice can be wrapped and then immediately submersed in water. You don't have to wait a few hours before you declare that circuit, pump motor, etc. operable. After you wrap it, you're ready to go. Another thing about T&B Self-Fusion Tape's process is that it works under cold, hot or moist conditions. Most competitor's products and even adhesive based products loose or decrease in the fusion properties under cold or hot/humid conditions. This is not true for either of the Thomas & Betts products... they will even fuse under water ! The applying technician no longer has to put the tape in his pants pocket to keep it warm during cold condition or to keep it cool or air conditioned under hot conditions.



D. Dielectric Strength

All silicone based tapes and even heat & cold shrinks are known for their excellent insulating capabilities. A known phenomenon is that the thinner a rubber tape or insulating product is, the higher volts/mil rating it has. The military specification A-A 59163 specifies that a 10 mil thick tape should have a dielectric strength of >400VPM and a 40 mil thick tape should have a dielectric strength of >300VPM. T&B Self-Fusion's 40 mil Tape is specified to be >400VPM and its 12 mil thick tape is >800VPM. Of course all T&B Self-Fusion Tape products actual tested values are much higher than this. Obviously this makes all Tape Fusion products excellent insulators. The 20 mil product is specified to be >600VPM.

E. Water Absorption

The specified water absorption for T&B Self-Fusion Tape products is <0.5%. The MIL spec requirement for most other silicone based products is <3.0%. Most vinyl and EPR products don't mention their water absorption rating because they can actually absorb water and swell, obviously effecting their electrical insulation capabilities in an adverse manner. Based on the extremely low water absorption characteristic of Tape Fusion and its high tensile strength, water or moisture will not absorb through the tape or be able to migrate between the cable jacket and the tape, thus maintaining a perfect water tight seal.

F. Easy release liner

T&B Self-Fusion Tape has an easy release liner. This means that you don't have to pick at the liner to try and remove it. It comes off quickly and easily and is not static sensitive like most other products. In addition, T&B Self-Fusion Tape's liner is black in color so that it is easy to see. Most plants and factories do not want materials left on the floor which can later end up in drains and pipes because they are clear in color and difficult to see. The black color of T&B's Self-Fusing Insulation Tape liner eliminates this concern.



G. T&B Self-Fusion insulating compound/putty

There is no other product on the market like this! It's a clay/putty like compound that is soft enough to mold into any cavity or change in dimension, yet consistent enough to hold its shape after it has been applied. The putty is typically used in medium to high voltage applications where the terminal lug or connectors used to terminate or splice a device that have large changes in dimensions or are bolted together. The area between the bolt and barrel of a lug, or the area where a reducer causes a change in dimension is typically wrapped over and over to fill in this area. This process typically takes significant time to accomplish and uses large quantities of tape unnecessarily. When using heat or cold shrink, manufacturers recommend using a shim to fill in this area. With T&B Self-Fusion Tape and putty, the process is "almost" instantaneous. Just take a strip of putty and quickly mold it into the desired shape, then wrap over with Fusion Tape. We have found that the time difference to prepare and finish a splice with or without T&B Self-Fusion putty is substantial. A splice that normally takes 15 to 20 minutes without T&B's Self-Fusion putty will typically take 5 to 10 minutes with T&B Self-Fusion Tape and putty combination. The savings are substantial on all fronts.



Material Safety Data Sheet - 1 of 3

Identity

Section I	Product Identification
Trade Name	T&B Self-Fusing Insulation Tape
Retailer	Thomas and Betts LTD
Chemical Name/Synonyms:	Silicone Rubber MIL A-A 59163

Section II - Hazardous Ingredients

(typical values - not specifications)

Hazardous Components

	Chemical Name	CAS #	%	
	Octoamethylcyclo-tetrasilxane	556-67-2	<2	
	Boric Acid	10043-35-3	<1	
Perkadox PD-50S-PS-A	Amorphous Fumed Silical Di(2,4-dichlorobenzoyl) peroxide	112945-52-5 133-14-2	<40 <2	** Dust hazard

** This material is encapsulated in a polymeric binder which eliminates airborne exposure to Dust hazard.

ALL OTHER INGREDIENTS ARE NON HAZARDOUS AND ARE NOT LISTED SINCE PROPRIETARY.

Section III - Physical Data

Boiling Point	Units	Specific Gravity (H2O=1)
N/A	N/A	1.178
Vapor Pressure (mm Hg.)	Melting Point	Units
N/A	N/A	N/A
Vapor Density (air=1)	Evaporation rate	
N/A	N/A	
Solubility in water	% Volatiles (by volume)	
Not Soluble	N/A	
Appearance	Odor	
Bright Red Rubbery Solid	Sweet odor	

Section IV - Fire and Explosion Hazard Data

Flash Point	Units	Method	Flammable Limits	LEL	UEL
N/A	N/A	N/A	N/A	N/A	N/A

Extinguishing Media

Use standard fire fighting techniques to extinguish fires involving this material.

Dry chemical, Carbon Dioxide, Fine water spray.

Special Fire-Fighting Procedures

As in any fire, prevent human exposure to fire, smoke fumes, or products of combustion.

Evacuate non-essential personnel from fire area. Firefighters should wear full face, self contained breathing apparatus.

Unusual Fire and Explosion Hazards

None known.

Thomas&Betts



Material Safety Data Sheet - 2 of 3

Section V - Health Hazard Data

Primary Route of Exposure	Threshold Limit Value
Contact	N/A
Effects of Over Exposure	
No Significant Effect	

Inhalation of Airborne Contamination Generated during Heat Cure, or Combustion should be avoided.

Section VI - Emergency First Aid Procedures

Eye Contact	Eye contact is not expected to occur during normal use of final product. No adverse health effects are expected from eye contact.
Skin Contact	No adverse health effects are expected from skin contact. Contact with skin during final product use is not expected to result in significant irritation.
Ingestion	Due to the physical state of this material, ingestion is unlikely to occur. No adverse health effects are expected from swallowing of the final product.
Inhalation	This product may have a characteristic odor; however, no adverse health effects are anticipated. Health effects from inhalation are not expected unless the product is in combustion. If products of combustion are inhaled, remove to fresh air. Seek medical attention if respiratory irritation occurs, or breathing becomes difficult.

Section VII - Reactivity Data

Conditions Causing Instability

Product is stable.

Incompatibility (materials to avoid)

None known.

Hazardous Decomposition Products

Carbon Monoxide, Carbon Dioxide, Silicon Dioxide.

Hazardous Polymerization

Will not occur.

Special Sensitivity

None.

Section VIII - Precautions for Safe Handling and Use

Steps to be taken in case material is released or spilled

Remove material from floor. Dispose of material if contaminated.

Waste Disposal Method

Dispose of in accordance with all local and federal regulations.

Precautions to be taken in handling and storing

Store in cool, dry well ventilated area.

Engineering controls

As dictated by use process.



Material Safety Data Sheet - 3 of 3

Section IX - Special Protection Information

Respiratory Protection	Not normally required except for products of combustion.
Eye & Face Protection	Safety glasses or normal departmental safety requirements.
Protective Gloves	Not normally required.
Other Protective Equipment	Use good personal hygiene.
Ventilation	Not normally required. Local ventilation is recommended for high temperature processes.

Section X - Shipping and regulatory Classification Data

DOT Shipping Name :	N/A
DOT hazard Class :	N/A
DOT Label(s) :	N/A
EPA Hazard Waste :	N/A
OSHA Hazard Class :	N/A
WHMIS Classification :	N/A
NFPA/HMIS Classification :	
Health :	1
Flammability :	0
Reactivity :	0

The information in this MSDS was obtained from sources which we believe to be reliable. HOWEVER, THE INFORMATION IS PROVIDED WITHOUT ANY WARRANTY, EXPRESSED OR IMPLIED, REGARDING ITS CORRECTNESS.

The conditions or methods of handling, storage, use & disposal of the product are beyond our control. FOR THIS AND OTHER REASONS, WE DO NOT ASSUME RESPONSIBILITY AND EXPRESSLY DISCLAIM LIABILITY FOR LOSS, DAMAGE OR EXPENSE ARISING OUT OF OR IN ANY WAY CONNECTED WITH THE HANDLING, STORAGE, USE OR DISPOSAL OF THE PRODUCT.



T&B Self-Fusion Tape Application Procedure

1.0 Minimum Requirements

Minimum requirements to follow during preparation of any tape configuration are as follows :

- A. At least two (2) layers of tape should be applied over any surface onto which the tape is wrapped (i.e. bare connection, or cable/wire insulation or jacket).
- B. Tape must be overlapped onto the cable/wire insulation/jacket a minimum distance of 1.5” when an environmental seal is required.
- C. First layer of tape should be applied with maximum stretch (<75% of original width). Second layer should be applied with minimal/zero stretch.

2.0 General Procedure

- A. If “Fill” is required. Fill in and around all irregular surfaces using T&B Self-Fusion compound in order to cover sharp surfaces (i.e. bolts, screws, nuts, terminal lug, butt splice, electrical connector, etc.) and also to create a smooth evenly tapered surface, prior to application of T&B Self-Fusion Tape. Note : When using tape for this purpose, simply stretch and push tape into cavity using finger or thumb pressure. Cutting small pieces and pushing tape into cavity is another method for filling the irregular surfaces.
- B. Cut an appropriate length of tape from the roll and remove the black liner, taking care not to allow the tape to fold over onto itself.
- C. Begin wrapping the first layer of tape onto the wire or connection by holding the lead end on the surface and stretching the tape around until it touches itself. The first layer of tape should be stretched continually so that the tape reduces to <3/4 of its original width. The tape should be applied until it extends a minimum of 1 inch past any bare, un-insulated conducting surface. Note : Tape should be wrapped in a half-lapped fashion. If an environmental seal is not required, then the tape doesn’t need to be stretched on any layer.
- D. Wrap a second layer of tape over the entire surface of the first layer. Note : It is not necessary to stretch the second layer of tape, as the first layer provides the permanent environmental seal and the tape fuses to itself upon contact.
- E. If for any reason, any customer wishes to cover T&B Self-Fusion Tape with another manufacturers/vendors tape, this is acceptable. Wrapping with another product will not degrade the splice and T&B Self-Fusion Tape will not adversely react with it.



3.0 Guidance on specific Tape Configurations

Parallel or stub splices

Prior to connecting the wires of a parallel splice together, it is recommended that each wire be individually wrapped with tape as follows. Starting at the lug barrel, hold the tape by holding the lead end on the surface of the barrel and stretching the tape around the barrel until the tape touches itself. Then continue stretching the tape (<75% of original width) wrapping down onto the cable/wire insulation/jacket a minimum distance of 1". Now, bolt the terminal lugs together and squeeze the wires together so that the previously wrapped wires stick to one another except for the last 3/8". Separate the wires at end or last 3/8" of the 1" distance into a small "V" or crotch between the wires. Fill the "V" area along the length of the wires with either T&B Self-Fusion Tape or an apex of triangular tape to make a flat surface between the length of the wires that are stuck together. Also "fill" the areas around the bolt, terminal lug and barrel. Now, after completing the "fill", continue wrapping tape until all minimum requirements are met. In addition, the crotch area at the end of the 1" distance must be wrapped with tape in a criss-cross pattern in order to seal between the wires with tape. Also, the two wires must be wrapped around a minimum of twice in order to hold them together.

"Y" or "V" Connections

Using T&B Self-Fusion insulating putty, fill the area around the bolt and going down to the end of the terminal lugs up to the cable/wire insulation/jacket. As an alternate method, fill using T&B Self-Fusing Insulation Tape. When using tape, wrap into the crotch area with a criss-cross pattern, going between the wires. The "fill" (either smooth or tape) should extend up to the cable/wire insulation cutback. After the "fill" is applied, wrap tape down the wire to the minimum 1" distance. Continue wrapping tape until all minimum requirements are met.

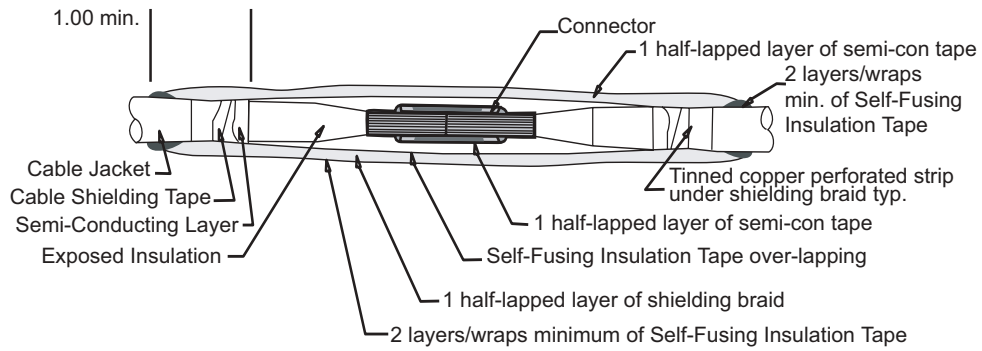
4.0 Inspection

The following criteria, as a minimum, shall be used for inspection of completed splices :

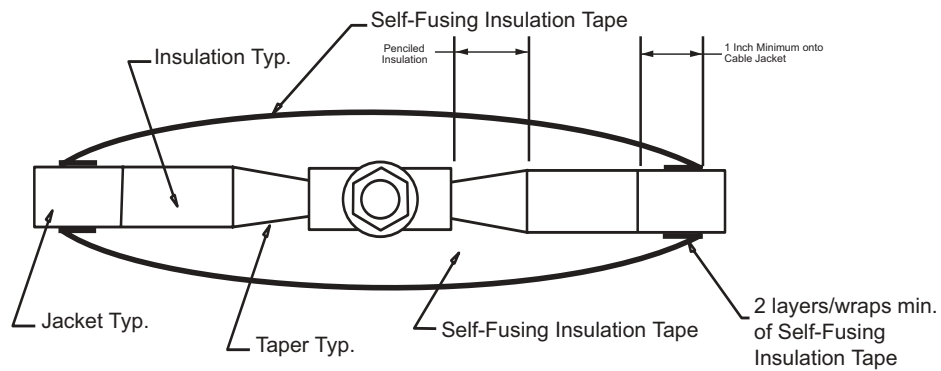
- A. Application of finger pressure over the splice surface should not reveal any significant voids.
- B. Tape should extend onto the Cable/wires jacket a minimum distance of 1 inch.
- C. Second layer of tape should be applied with minimal/zero stretch. This can be visually inspected by verifying visually that each wrap of tape is close to its 1" width.

T&B Self-Fusing Insulation Tape

5KV Shielded Cable Splice

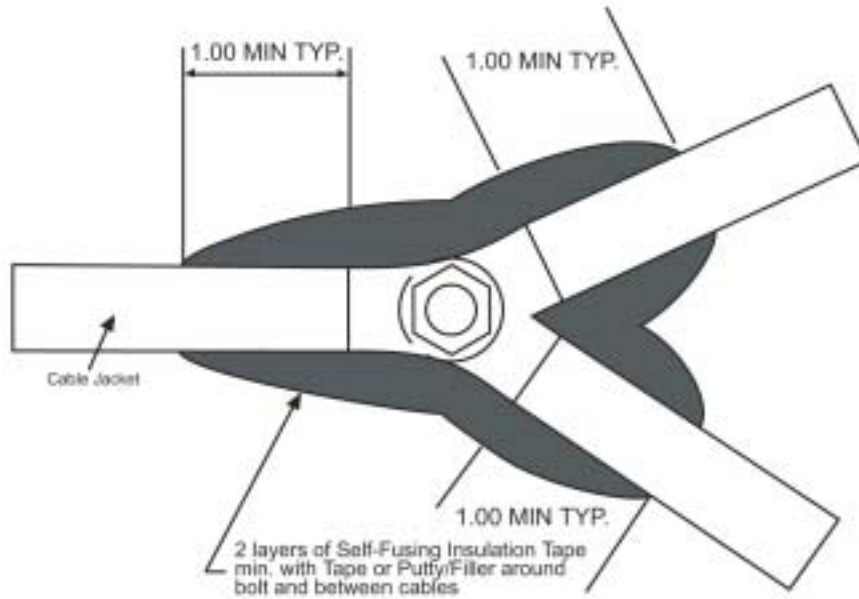


5KV Non-Shielded Cable Splice

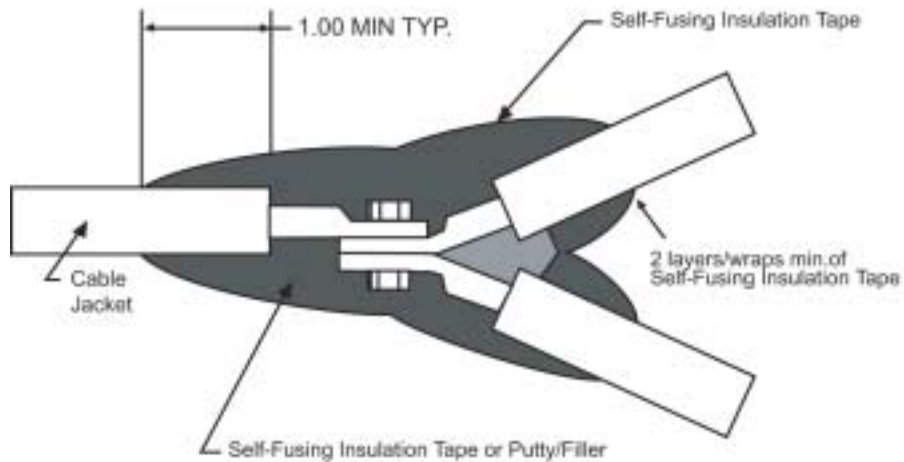


T&B Self-Fusing Insulation Tape

600V Bolted Y Splice

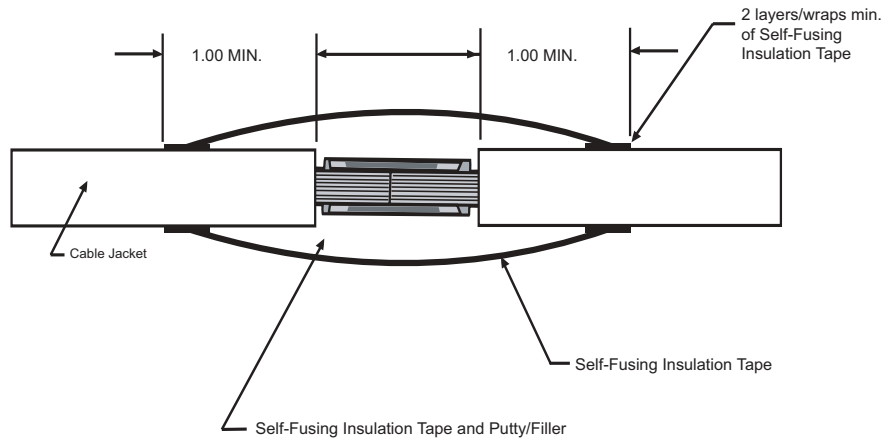


600V Bolted Y Splice Side View

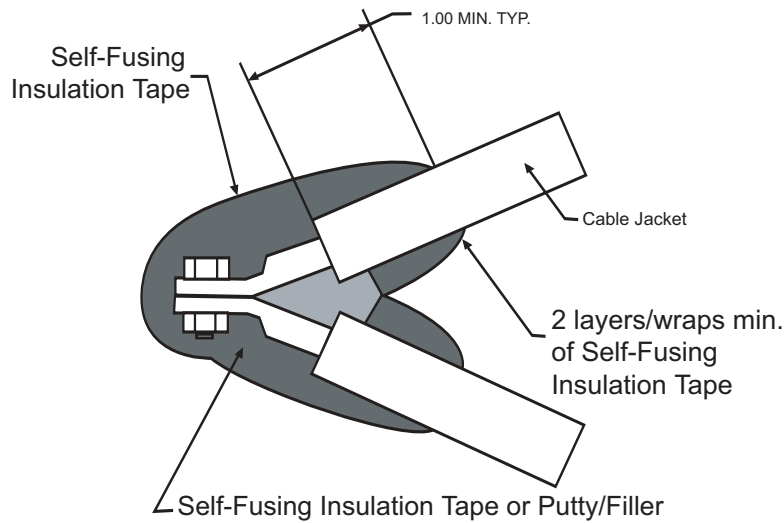


T&B Self-Fusing Insulation Tape

600V In-Line Crimped Splice



600V Parallel or V Splice



T&B Self-Fusing Insulation Tape



APPLIED TECHNICAL SERVICES, INCORPORATED ISO 9001

1190 Atlanta Industrial Drive, Marietta, Georgia 30066 • (770) 423-1490 Fax (770) 424-6415

EVALUATION OF TAPE REPAIR OF AN AUTOMOTIVE COOLING HOSE

ATS JOB # D55612

PURCHASE ORDER # TBA

Prepared for


MICHAEL J. LEBLANC
GTG ENGINEERING, INC.
P.O. BOX 11182
SOUTHPORT, NC 28461

Prepared by



Gene Price, Materials Testing

Approved by



Shawn Murray, Supervisor, Materials Testing

This Report May Not Be Reproduced Except in Full

This report represents interpretation of the results obtained from the test specimens and is not to be construed as a Guarantee or Warranty of the condition of the entire material lot.

*Professional Engineers and Scientists
Design • Consulting • Testing and Inspection*

Members in AAES, ACS, ASM, ASME, ASNT, ASQC, ASTM, AWS, FSCT, IMAI, NACE, NCSL, NFPA, SAFS

Thomas & Betts

T&B Self-Fusing Insulation Tape



APPLIED TECHNICAL SERVICES, INCORPORATED

ISO 9001

1190 Atlanta Industrial Drive, Marietta, Georgia 30066 • (770) 423-1400 Fax (770) 424-6415

MATERIALS TEST REPORT

Ref. D55612

Date: June 14, 2004

Page 1

of

8

Purchase Order TBA

Michael J. LeBlanc
GTG Engineering, Inc.
P.O. Box 11182
Southport, NC 28461

Subject

Determining the ability to field repair an automotive cooling hose using customer provided tape.

Material

1 inch wide plastic tape

Objective and Background

To simulate a section of automotive cooling hose in a manner that simulates a failure under operating conditions and to then repair the failure with the customer provided tape and to test the repair.

Test Procedure and Results

A section of automotive cooling hose was obtained from a local parts store. The hose was plugged at one end and the opposite end was fitted to allow the addition of coolant and to enable pressure adjustment and monitoring (Figure 1). This assembly was filled with a 50% water-antifreeze mixture. A utility hose was connected and the entire assembly was placed in an environmental chamber where the temperature was raised to 299.5° F (148.6° C). After reaching the desired temperature a hole was cut into the hose to simulate a typical failure (Figure 2).

A repair was made on the hole using the provided tape by the following application method: A 66 inch long section of the tape was stretched to 5/8 inch width and applied in 3 layers over a 3 inch run centered on the leak. Each lap was applied in half width (5/16 inch) overlaps. An 18 inch section was then stretched to 7/8 inch width and applied in 1 layer over the total 3 inch area. This final layer was also applied in half width (7/16 inch) overlaps (Figure 3).

Thomas & Betts

T&B Self-Fusing Insulation Tape



APPLIED TECHNICAL SERVICES, INCORPORATED

ISO 9001

1198 Atlanta Industrial Drive, Marietta, Georgia 30066 • (770) 423-1400 Fax (770) 424-6415

MATERIALS TEST REPORT

Ref. D55612

Date: June 14, 2004

Page 2 of 8

The environmental chamber was then closed, and the temperature raised to 299.5° F (148.6° C) (Figures 4 through 6). The test article was then subjected to the following pressures as prescribed by the customer:

- 10 psi for 5 minutes
- 20 psi for 7 minutes
- 28 psi for 49 minutes
- 32 psi for 11 minutes
- 40 psi for 2 minutes
- 50 psi for 2 minutes
- 60 psi for 2 minutes
- 70 psi for 2 minutes
- 80 psi for 2 minutes

This marked the end of the test.

Discussion and Conclusions

As 80 psi was approached the hose began to expand greatly while the repair remained virtually unchanged. The tape performed satisfactorily under pressures and temperatures well beyond that which is encountered in automotive cooling systems.

T&B Self-Fusing Insulation Tape



Close-up showing hole in rad hose.



“Failure” repaired by tape under test.



Tape wrapped over hose as seen through the test chamber.



Test Chamber and test setup showing positive displacement pump and pressure gauge.
Note: Tape seal can be vaguely seen wrapped over hose.



Chamber Temperature (°C)



Chamber pressure (PSI)
for first hour of test.

	Dielectric Strength (Volts per mil)	Tensile Strength (PSI)	Approx. Force (lbs) reqd to break	Elongation % tape will stretch before breaking	Adhesion unravel distance after 3 minutes with 600 gram weight	Water Absorption	UV/Ozone Resistance	Abrasion Resistance	Available Sizes/ Configurations	Liner Color/ material	Storage Conditions	Comments/ Advantages/Dis-advantages
T&B Self-Fusing Insulation Tape	400 600 800	1200	28 lbs - 1" X 40 mil-TR 16 lbs - 1" X 20 mil-TR 12 lbs - 1/2" X 20 mil-RT 14.4 lbs - 1" X 12 mil-RT	>325	<1"	<0.5%	Excellent	Good	1", 1/2", 12 mil, 20 mil, 40 mil, all 36 ft	Black/ Poly	No temp. restrictions. Store in supplied bag.	Easy to use. Has easy release liner (not static sensitive), high dielectric, high strength therefore more tension on seal, resists abrasion therefore one tape product, various configurations. Sticks and eventually becomes one with T&B Self-Fusing Insulation Tape (filler). Fastest Self-fusing product.
Bishop 20 Plyseal	600	700	10 lbs - 1" X 20 mil-RT	400%	<2 "	Not rated	Excellent	Poor	1" X 20 mil X 30 ft	Clear/ Mylar	Shelf life less than 1 year at 85°F or less temp.	20 plysil is extremely sensitive to cuts or abrasions and is only rated to 180°C. Due to the sensitivity, it must be used with a jacketing tape over it. Also, it only comes in one size and therefore lots of tape must be used on larger connections. See paperwork.
3M Scotch 70	875	800	12 lbs - 1/2" X 20 mil-RT	450%	Not rated	Not rated	Excellent	Poor	1" X 12 mil X 30 ft	Clear/ Mylar	Behind present stock in clean dry place at temp. of 70°F and 40 to 50% relative humidity. Prolonged exposure to temps in excess of 49°C (120°F) can cause a loss of fusion in the tape. Proper stock rotation is recommended.	Scotch 70 is extremely sensitive to abrasion, like 20plysil. It is rated for -90°C to 260°C but continuous at 180°C only. It also only comes in one size and thickness and is close to double the price of T&B Self-Fusing Insulation Tape 12mil roll that has 6 more feet of length than scotch 70. Mylar liner is extremely difficult to remove.
TPC Wire & Cable Vulko Wrap	300 for 40 mil	700	17 lbs - 1" X 40 mil-RT	300%	Not rated	Not rated	Excellent	Poor	1" X 12 mil X 30 ft	Clear/ Mylar	Should be stored <70°F in cool/ dry environment for max. shelf life.	Vulko has poor fusion. Has poor abrasion/tear resistance and a temp. range of -60° to 400°F. Vulko liner is barely wider than tape and is extremely difficult to remove, besides being static sensitive like all mylar liners.
United Controls Nuke Tape	300 for 40 mil	800	20 lbs - 1" X 40 mil-RT	375%	<2"	<3%	Excellent	Fair	1" X 40 mil X 36 ft	Red/ Poly	Should be stored <85°F.	T&B Self-Fusing Insulation Tape beats Nuke on all properties except elongation. In addition, T&B Self-Fusing Insulation Tape is cheaper.
MoCap/Vypar X-treme Tape	400 for 20 mil	600	10 lbs	300%	Not rated	Not rated	Excellent	Poor	1" X 20 mil X 10 ft	Clear/ Poly		Low dielectric compared to T&B Self-Fusing Insulation Tape.
Magic Wrap	<100	<100		>800%	Not rated	Not rated	Not rated	Good	1" X 16 ft	White/ teflon		Extremely low dielectric. Looks like EPR which swells with oil. Extremely low tensile therefore hard to put tension on hose, etc. to perform mechanical seal. Actual usage has shown to be ineffective for mechanical seal. Low temperature only (100°C).
EPR (Ethylene Propylene) Scotch 130C, etc.	<700VPM	<200		>700%		Not rated / poor	Good	Excellent / good				EPR tapes (usually black) typically have very low tensile and depend on adhesive to seal. They swell from oil based chemicals and do not have as good UV resistance as silicone based products. Typically have low temperature ratings and get goeey under high temperature. EPR tapes are very resistant to abrasion, but are extremely difficult to remove. Scotch 130C is an example of EPR tapes.
Vinyl Tape (Standard electrical tape)	To be used up to 600Volts only		15 lbs	250%	Poor	Poor	Poor	Good				Vinyl tapes are what standard electrical tapes are made of. It is an extremely cheap material (20 Cents to 80 Cents/ roll). Typically adhesive based. Does not prevent water intrusion is an insulator only. Not ozone/ UV resistant. Gets sticky and goeey over time. For medium and high voltage splices this type of tape is wrapped over the silicone and EPR based tapes as a "jacketing layer". Not oil resistant. Low temperature rating 80°C. Only good at low temperatures.