
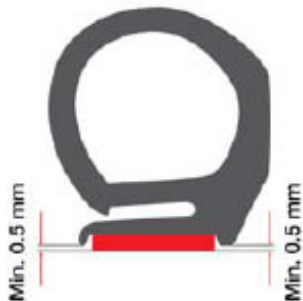


3M™ Acrylic Foam and Acrylic *Plus* Tapes

OEM Application Guidelines for Heat-Activated Tapes

Seal Tape Land Design

When designing a seal for tape attachment, consideration should be given to the material and grades of material used for the various portions of the seal, and how to best distribute the stress across the tape width when a force is applied to the seal.

Consideration	Recommendation	Comments
Stress on Tape	Design seal to minimize cleavage/low angle peel forces	Minimize load on tape by paying special attention to peel/cleavage. Incorporating a hinge within the seal design is often an effective means of reducing stress on the tape.
Seal Length	Seal length in free state should match the length of the application area.	Should closely match the length of the application area. Short seals needing to be stretched and long seals with excess material, may result in unsatisfactory appearance and sealing behavior.
Seal Foot Hardness	Between 70 to 95 Shore A	A firm tape land can make it easier to apply heat activated tape, although it is possible to successfully laminate soft sponge seals.
Seal Foot Width	2mm wider than the tape width	The tape land area must be wide enough to allow for tape placement. Allowing 1mm of clearance on each side of the tape can make it easier to process the tape inline. 
Recommended Tape Width	Maximum available within the application or process	The tape width should be determined by the stress handling requirements of the application as well as the capabilities within specific processes.
Hider Lip Height	Less than the tape thickness – 0.5 mm	Tape should stand proud of the hider lip by a minimum of 0.5mm to allow the tape to make contact with the vehicle and to avoid placing peel forces on the tape when the seal is installed. 

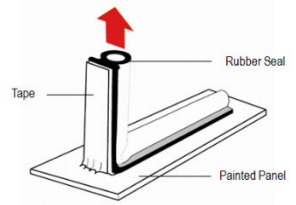
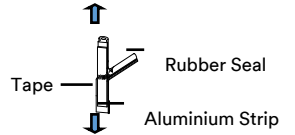
Planetary Roll Handling

When handling planetary rolls, particularly longer and narrower widths, care should be used so that the rolls do not separate. Note that handling rolls of heat-activated attachment tape is typically more challenging than handling PSA tapes, because the heat-activated adhesive side does not stick to the backside of the liner. Level wound rolls are also an option for longer run times and ease of handling.

Consideration	Recommendation	Comments
Roll Handling Recommendation	Lift roll from box using separation wafer	Apply a thin, uniform coating of the promoter to the bonding surface, using the minimum amount that will fully coat the surface. A wet coating of 0.002 inches or less ensures a good application. Adhesion promoter can be applied by gravity feed wipe, knurled roller, felt-tipped applicator or other similar type applicator.

Principles of Heat-Activated Lamination

When laminating heat-activated tapes to rubber seals there are three primary variables that affect the bond quality: temperature, pressure and line speed.

Considerations	Recommendation	Comments
Substrate Preparation	In all cases, the extrusion must be clean	<p>If the time period between extrusion and tape lamination is longer than 24 hours, blooming of additives can occur which could affect the ability of the heat-activated adhesive to bond to the extrusion.</p> <p>If signs of blooming are present, it is recommended that the seal be cleaned with toluene* or heptane*.</p> <p>Avoid slip coatings on the tape land area.</p> <p>**Important Note: Please consult Federal, State and Local Regulations. State Volatile Organic Compound (VOC) regulations may prohibit the use of certain alcohol solutions or other solvents. Check with your state environmental authorities to determine whether use of a solution or solvent is restricted or prohibited. When using solvents, extinguish all ignition sources, including pilot lights, and follow the manufacturer's precautions and directions for use</p>
Bonding Temperature and Line Speed	Heatbond Laminator	<p>The temperature required to activate the heat-bond adhesive on the acrylic foam is approximately 176°C (350°F).</p> <p>The output temperature setting chosen will depend on the speed at which the tape is being laminated to the rubber. For example, to run a laminator at 30 feet per minute (FPM), the exit temperature at the torch nozzle should be around 590°C (1100°F).</p>
Laminating Pressure	Approximately 30 psi is required to bond the tape to the rubber	Pressure will vary depending upon the profile of the extrusion. The objective is to apply enough pressure to wet-out the heat activated adhesive.
Tape Stretch	Should be minimized and should not exceed 4% in length	Stretching the tape when laminating should be minimized. The tape can be stretched up to 4% to accommodate a seal that contracts after the tape is laminated. This most often occurs when the tape is laminated inline directly after extrusion.
Evaluating the Bond	Evaluate after the tape has cooled	<p>Edge Check: Pick at edge of laminated tape with finger nail or utility knife to make a judgment on the quality of the bond.</p>
		<p>90° Peel: Apply seal to a substrate such as anodized aluminum and peel back the rubber to a 90° angle. With a sharp instrument cut through the tape down to the rubber, but not into the rubber, to initiate a failure. After the tape is cut, pull the assembly away from the substrate by hand at 90°.</p> 
		<p>T-Peel Test: Apply pressure sensitive adhesive (PSA) surface of tape to an aluminum strip of 5mil thickness and a width slightly exceeding the tape. The dull side of the aluminum foil will adhere readily to the PSA surface of the tape and can be pulled off by hand or using an Instron® tension tester to obtain a quantitative result.</p>  <p>Instron is a trademark of Illinois Tool Works Inc.</p>

Tabbing

Some taped seals are required to have a liner tab to facilitate liner removal by operators. The most common tabbing method for sealing applications is heat-bond tabs. Extended liner tabs and pressure sensitive adhesive (PSA) tabs may also be an option in some cases.

Considerations	Recommendation	Comments
Extended Liner Tabs	Application should determine length of tab	Extended liner tabs are produced by leaving a small excess of tape past the end of the part. The tape is then removed from this area, leaving just the liner to be used as the tab.
Heat Bond Tabs	3M™ Tabbing Tape 5400 and 5081	Typically applied using a heat bond tabbing machine. 3M Tape 5400 used for 3M™ Acrylic Foam Tapes. 3M Tape 5081 used for 3M™ Acrylic <i>Plus</i> Tapes.
Pressure Sensitive Adhesive (PSA) Tabs	3M™ Tabbing and Splicing Tape 5300 and 3M™ Splicing Tape 4240	Used for 3M™ Acrylic Foam Tapes
	3M™ Tabbing and Splicing Tape 5699	Used for 3M™ Acrylic <i>Plus</i> Tapes ST1200 and WT4112
		The reliability can be increased greatly with the use of an “over-under” tab – one that is folded and applied such that it contacts both sides of the liner.

Contact Information

The information provided in this technical document is intended as a guide for these products. For more information or help in selecting a 3M product for an application, please contact your 3M technical service representative or call 1-800-328-1684.

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