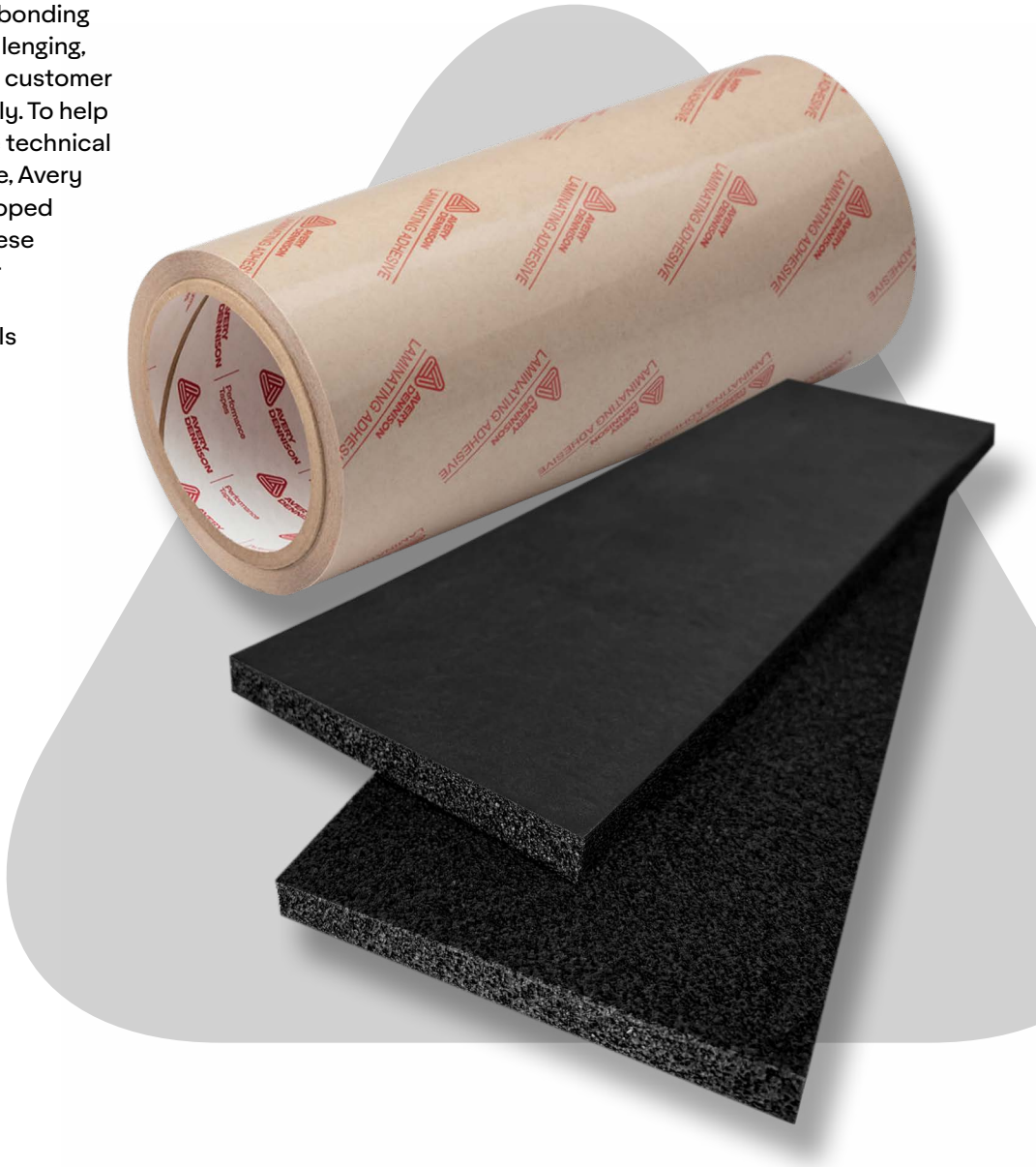
Avery Dennison Performance Tapes

Bonding Study: Fostek Automotive and Industrial EPDM Foams

Determining the correct adhesive when bonding to foam and other materials may be challenging, especially when seeking to provide your customer an accurate quote quickly and accurately. To help you with the adhesive selection, and the technical requirements your customer may require, Avery Dennison Performance Tapes has developed a series of adhesive bonding studies. These studies highlight the performance of our Core Series™ Portfolio products when combined with foams and other materials from industry leading manufacturers.



AVERY DENNISON

fostek
Developer & Manufacturer of Engineered Foams

Bonding to Fostek Automotive and Industrial EPDM Foams

Founded in 2004, Fostek Corporation continues to develop and manufacture high-quality engineered foams approved and specified by OEMs, Tier 1s, as well as other manufacturers worldwide. Fostek's IATF 16949 certified process benefits design engineers and customers that demand quality and performance across a wide variety of industries and applications.

Fostek's EPDM semi-closed and closed-cell continuous foam rolls and sheets are produced with verified lot-to-lot data consistency. The company's EPDM collection of semi-closed cell foams provides a wide choice of densities and compression deflection kPa ranges. This offering has grown significantly during the past few years as Fostek has demonstrated capabilities to tune-in its EPDMs for specific applications, such as: NVH; acoustic control and water sealing. EPDM is well known to be a viable polymer option foam versus cast PVC in many performance comparisons.

Fostek also developed a proprietary technology for its diverse family of vinyl/nitrile/neoprene blend foams. These foams deliver outstanding physical properties, mechanical performance, and compatibility with wide varieties of pressure-sensitive adhesives. Fostek's Vinyl/Nitrile/Neoprene blends are generally known for their durability and resistance to oil. Fostek foams possess a high process capability allowing its products to meet or exceed automotive and non-automotive specifications.

Fostek's facilities and processes are IATF 16949:2018 certified to ensure the highest quality products for automotive related products as well as the rest of our family of non-automotive products.

Fostek Automotive and Industrial EPDM Foams and Avery Dennison Adhesive Sample Preparation

Avery Dennison adhesive products were backed with a 2 mil PET film and trimmed to a one-inch width. Two sample sets were laminated to Fostek Industrial EPDM Foams.

Set	Description
1	Laminated at room temperature. 30% compression, 20 psi, 20 fpm, 72 hr recovery after lamination.
2	Laminated at 220˚F, 30% compression, 20 psi, 20 fpm, 72 hr recovery at room temperature after lamination.

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Fostek Automotive and Industrial EPDM Foams and Avery Dennison Adhesive Sample Testing

Foam bonding is affected by the foam's base polymer, thickness, and cell type. Adhesion to foam is impacted by factors such as: adhesive mass, pressure, compression, lamination speed and temperature. All samples were tested at 180° Peel Adhesion at 12 in/min. It was determined by this study that heat lamination is beneficial (220˚F).

S1007 = Fostek Type 2996 S1S Supersoft, Semi-Closed Cell EPDM

Adhesive Chemistry	Product(s)	Rating	Age Testing
General Purpose Rubber	FBR 8950	Best	Best
High Shear General Purpose Rubber	FT 8345, FT 8368	Good	Best
Emulsion Acrylic	FBA 1118, FBA 7918, FBA 8318	Better	
High Performance Low VOC Acrylic	FT 8299	Best	
General Purpose Acrylic	FT 1123, FT 1126	Best	Best
Pure Acrylic	FBA 1115, FBA 8315	Good	
LSE Modified Acrylic	FT 1943, FT 3043	Best	
Differential - General Purpose Rubber / High Shear Rubber	FT 8327	Best	Best
Differential - High Shear Acrylic/ High Shear Rubber	FBD 8393	Good	
Other Non-Core Series	FT F3315 AZ	Best	
Other Non-Core Series	FT F9500Z	Best	Best

S1008 = Fostek Type 2999 S2S Closed Cell EPDM

Adhesive Chemistry	Product(s)	Rating	Age Testing
General Purpose Rubber	FBR 8950	Better	
High Shear General Purpose Rubber	FT 8345, FT 8368	Good	
Emulsion Acrylic	FBA 1118, FBA 7918, FBA 8318	Not Recommended	
High Performance Low VOC Acrylic	FT 8299	Not Recommended	
General Purpose Acrylic	FT 1123, FT 1126	Not Recommended	
Pure Acrylic	FBA 1115, FBA 8315	Not Recommended	
LSE Modified Acrylic	FT 1943, FT 3043	Best	Best
Differential - General Purpose Rubber / High Shear Rubber	FT 8327	Good	
Differential - High Shear Acrylic/ High Shear Rubber	FBD 8393	Not Recommended	

Good = Likely to achieve foam tear with heated lamination.
Better = May achieve foam tear without heat lamination.
Best = Likely to achieve foam tear at room temperature

Heat Age = For the accelerated age testing (ASTM D3611), the foam was laminated at room temperature then placed in a chamber and subjected to 66C (150F) and 80% RH for 96 hours. This simulates roughly two years of aging. The samples were then tested at 180 degree peels at 12 inches per minute. **Products that achieved foam tear after repeating the accelerated age testing received the Best rating.**

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S1009 = Fostek Type 3996.1 S1S Supersoft, Semi-Closed Cell EPDM

Adhesive Chemistry	Product(s)	Rating	Age Testing
General Purpose Rubber	FBR 8950	Best	Best
High Shear General Purpose Rubber	FT 8345, FT 8368	Good	Best
Emulsion Acrylic	FBA 1118, FBA 7918, FBA 8318	Best	
High Performance Low VOC Acrylic	FT 8299	Not Recommended	
General Purpose Acrylic	FT 1123, FT 1126, FBA 8960, FT 8346	Better	Best
Pure Acrylic	FBA 1115, FBA 8315	Good	
LSE Modified Acrylic	FT 1943, FT 3043	Best	
Differential - General Purpose Rubber / High Shear Rubber	FT 8327	Best	Best
Differential - High Shear Acrylic/ High Shear Rubber	FBD 8393	Not Recommended	
Other Non-Core Series	FT F9500Z	Best	Best

S1010 = Fostek Type 6996.1 S1S Supersoft, Semi-Closed Cell EPDM

Adhesive Chemistry	Product(s)	Rating	Age Testing
General Purpose Rubber	FBR 8950	Best	
High Shear General Purpose Rubber	FT 8345, FT 8368	Good	
Emulsion Acrylic	FBA 1118, FBA 7918, FBA 8318	Not Recommend	
High Performance Low VOC Acrylic	FT 8299	Not Recommend	
General Purpose Acrylic	FT 1123, FT 1126, FBA 8960, FT 8346	Not Recommend	
Pure Acrylic	FBA 1115, FBA 8315	Not Recommend	
LSE Modified Acrylic	FT 1943, FT 3043	Good	
Differential - General Purpose Rubber / High Shear Rubber	FT 8327	Best	Best
Differential - High Shear Acrylic/ High Shear Rubber	FBD 8393	Not Recommend	

Good = Likely to achieve foam tear with heated lamination.
Better = May achieve foam tear without heat lamination.
Best = Likely to achieve foam tear at room temperature

Heat Age = For the accelerated age testing (ASTM D3611), the foam was laminated at room temperature then placed in a chamber and subjected to 66C (150F) and 80% RH for 96 hours. This simulates roughly two years of aging. The samples were then tested at 180 degree peels at 12 inches per minute. **Products that achieved foam tear after repeating the accelerated age testing received the Best rating.**

S1011 = Fostek Type 8996.8 S1S Supersoft, Semi-Closed Cell EPDM

Adhesive Chemistry	Product(s)	Rating	Age Testing
General Purpose Rubber	FBR 8950	Best	Best
High Shear General Purpose Rubber	FT 8345, FT 8368	Good	
Emulsion Acrylic	FBA 1118, FBA 7918, FBA 8318	Good	
High Performance Low VOC Acrylic	FT 8299	Not Recommended	
General Purpose Acrylic	FT 1126, FBA 8960, FT 8346	Best	
Pure Acrylic	FBA 1115, FBA 8315	Not Recommended	
LSE Modified Acrylic	FT 1943, FT 3043	Not Recommended	
Differential - General Purpose Rubber / High Shear Rubber	FT 8327	Best	Best
Differential - High Shear Acrylic/ High Shear Rubber	FBD 8393	Not Recommended	
Other Non-Core Series	FT F9500Z	Best	Best

S1012 = Fostek Type XB41 S1S Closed Cell Vinyl/Nitrile

Adhesive Chemistry	Product(s)	Rating	Age Testing
General Purpose Rubber	FBR 8950	Good	
High Shear General Purpose Rubber	FT 8345, FT 8368	Good	Best
Emulsion Acrylic	FBA 1118, FBA 7918, FBA 8318	Not Recommended	
High Performance Low VOC Acrylic	FT 8299	Better	
General Purpose Acrylic	FT 1123, FT 1126, FBA 8960, FT 8346	Better	
Pure Acrylic	FBA 1115, FBA 8315	Best	
LSE Modified Acrylic	FT 1943, FT 3043	Better	
Differential - General Purpose Rubber / High Shear Rubber	FT 8327	Good	
Differential - High Shear Acrylic/ High Shear Rubber	FBD 8393	Good	
Other Non-Core Series	FT F3315 AZ	Best	

Good = Likely to achieve foam tear with heated lamination.
Better = May achieve foam tear without heat lamination.
Best = Likely to achieve foam tear at room temperature

Heat Age = For the accelerated age testing (ASTM D3611), the foam was laminated at room temperature then placed in a chamber and subjected to 66C (150F) and 80% RH for 96 hours. This simulates roughly two years of aging. The samples were then tested at 180 degree peels at 12 inches per minute. **Products that achieved foam tear after repeating the accelerated age testing received the Best rating.**

S1049 = Fostek Type 3997 S1S Closed Cell EPDM

Adhesive Chemistry	Product(s)	Rating	Age Testing
General Purpose Rubber	FBR 8950	Best	Best
High Shear General Purpose Rubber	FT 8345, FT 8368	Best	Best
Emulsion Acrylic	FBA 1118, FBA 7918, FBA 8318	Not Recommended	
High Performance Low VOC Acrylic	FT 8299	Not Recommended	
General Purpose Acrylic	FT 1123, FT 1126, FBA 8960, FT 8346	Not Recommended	
Pure Acrylic	FBA 1115, FBA 8315	Not Recommended	
LSE Modified Acrylic	FT 1943, FT 3043	Better	
Differential - General Purpose Rubber / High Shear Rubber	FT 8327	Best	Best
Differential - High Shear Acrylic/ High Shear Rubber	FBD 8393	Not Recommended	
Other Non-Core Series	FT F9500Z	Best	Best

Good = Likely to achieve foam tear with heated lamination.
Better = May achieve foam tear without heat lamination.
Best = Likely to achieve foam tear at room temperature

Heat Age = For the accelerated age testing (ASTM D3611), the foam was laminated at room temperature then placed in a chamber and subjected to 66C (150F) and 80% RH for 96 hours. This simulates roughly two years of aging. The samples were then tested at 180 degree peels at 12 inches per minute. **Products that achieved foam tear after repeating the accelerated age testing received the Best rating.**

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