



Ultra-clean Laminating Adhesives

501FL • 502FL • 504FL

Technical Data

February, 1999

Description/ Features	3M Ultra-clean Laminating Adhesive 501FL	3M Ultra-clean Laminating Adhesive 502FL	3M Ultra-clean Laminating Adhesive 504FL
	• .001 in. thick adhesive • Plastic core • 2 mil PET, DS silicone liner • Thin bond line • Pressure used for lamination and application to a substrate • Acrylic polymer provides excellent adhesion to many substrates • Low outgassing and ionics	• .002 in. thick adhesive • Plastic core • 2 mil PET, DS silicone liner • .002 in. thick adhesive for rough surfaces • Pressure used for lamination and application to a substrate • Acrylic polymer provides excellent adhesion to many substrates • Low outgassing and ionics	• .004 in. thick adhesive • Plastic core • 2 mil PET, DS silicone liner • .004 in. thick adhesive for rough and uneven surfaces • Pressure used for lamination and application to a substrate • Acrylic polymer provides excellent adhesion to many substrates • Low outgassing and ionics

Application Ideas

- 3M™ Ultra-clean Laminating Adhesives are ideal for applications that need lower outgassing and ionics levels compared to current generation laminating adhesives.
- 3M ultra-clean laminating Adhesives have improved room temperature and high temperature shear performance for improved label and seal holding strength.
- 3M ultra-clean laminating Adhesives have low odor and low outgassing of volatile components which can cause fogging or condensation on vehicle windows.
- 3M™ Adhesives 501FL, 502FL and 504FL laminate easily to many substrates, and the film liner offers moisture resistance and improved die-cutability and web control.
- 3M adhesives 501FL, 502FL and 504FL have an acrylic chemistry that offers good thermal stability over moderate temperatures and short high temperature excursions when combined with a backing layer.
- Market application areas include: Automotive, Aerospace, Electrical Mechanical and General Industry.

Typical Performance

Typical Total Outgas Material by GC/MS (Modified ASTM 4626)

501FL 0.3-1.5 µg/cm² (Hydrocarbons, Organic acids, Esters, Alcohols, Phenols, Acrylates, Acetates, etc.)
502FL 0.5-2.5 µg/cm² (Hydrocarbons, Organic acids, Esters, Alcohols, Phenols, Acrylates, Acetates, etc.)
504FL 2.0-8.0 µg/cm² (Hydrocarbons, Organic acids, Esters, Alcohols, Phenols, Acrylates, Acetates, etc.)

Typical Total Ionics by Ion Chromatograph

501FL < 0.15 µg/cm² (Chloride, Nitrate, Sulfate)
502FL < 0.15 µg/cm² (Chloride, Nitrate, Sulfate)
504FL < 0.15 µg/cm² (Chloride, Nitrate, Sulfate)

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Typical Performance (continued)

Typical 90° Peel Data* (2-mil Aluminum backing @ 12 in./min. peel rate: oz./¹/₂ in. width)

Substrate @ Dwell Condition	3M Ultra-clean Laminating Adhesive 501FL	3M Ultra-clean Laminating Adhesive 502FL	3M Ultra-clean Laminating Adhesive 504FL
SS @ 15 min. RT (initial)	22	28	32
SS @ 72 Hr RT	36	41	60
SS @ 72 Hr 158°F	72	105	132

***Note:** Peel results will vary due to substrate type and condition, backing material properties and speed of the test set-up.

Typical Static Shear Test (SS and Aluminum substrates)

3M Ultra-clean Laminating Adhesive	Room Temperature	158°F
501FL, 502FL, 504FL	1,000g held 10,000 minutes	500g held 10,000 minutes

Typical Liner Release Values (180 degree liner removal, 90 in./min.)

501FL	30 g/inch width
502FL	32 g/inch width
504FL	33 g/inch width

Typical Automotive Fog Test

501FL	99 - 100
502FL	99 - 100
504FL	99 - 100

Note:

The above technical information and data should be considered representative or typical only and should not be used for specification purposes.

For Additional Information

To request additional product information or to arrange for sales assistance, call toll free 1-800-362-3550. Address correspondence to: 3M Bonding Systems Division, 3M Center, Building 220-7E-01, St. Paul, MN 55144-1000. Our fax number is 651-733-9175. In Canada, phone: 1-800-364-3577. In Puerto Rico, phone: 1-809-750-3000. In Mexico, phone: 5-728-2180.

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ISO 9002

This Bonding Systems Division product was manufactured under a 3M quality system registered to ISO 9002 standards.



Bonding Systems Division

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