



Dual Lock™ and Scotchmate™ Reclosable Fasteners Flame Resistant Products

Technical Data

April, 1999

Product Description 3M™ Dual Lock™ Fasteners SJ-3860/61/62 and 3M™ Scotchmate™ Fasteners SJ-3586/87/18/19 are designed to meet the 60 second vertical burn test, FAR 25.853 unsupported (i.e. not attached to a test substrate). Fasteners SJ-3860/61/62 and SJ-3518/19 comply with ASTM E162 Surface Flammability and ASTM E662 Smoke Density requirements. The Dual Lock Fasteners have the same adhesive as 3M's unique VHB™ Tapes for easy adhesion to many surfaces. The Scotchmate flame resistant fasteners are also available in plainback versions.

Products

Pressure Sensitive Dual Lock fasteners

SJ-3860	Type 250	.015 in. (0.38 mm) Clear VHB Tape
SJ-3861	Type 400	.015 in. (0.38 mm) Clear VHB Tape
SJ-3862	Type 170	.015 in. (0.38 mm) Clear VHB Tape

Pressure Sensitive Scotchmate fasteners

SJ-3586	Polyester Hook	.020 in. (.5mm) Rubber PSA
SJ-3587	Polyester Loop	.020 in. (.5mm) Rubber PSA
SJ-3518	Nylon Loop	.010 in. (.25mm) Rubber PSA
SJ-3519	Nylon Hook	.010 in. (.25mm) Rubber PSA

Plain Back Scotchmate fasteners

SJ-3486	Polyester Hook	No adhesive
SJ-3487	Polyester Loop	No adhesive
SJ-3418	Nylon Loop	No adhesive
SJ-3419	Nylon Hook	No adhesive

Applications Ideas

Potential Applications for User Evaluation

- Panels in rail passenger vehicles
- Airline insulation covers
- Cover plates for electronic controls
- Replace conventional mechanical fasteners in wide range of reclosable assembly and attachment applications

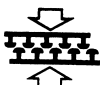
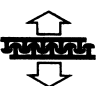
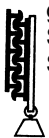

3M™ Dual Lock™ and 3M™ Scotchmate™ Reclosable Fasteners Flame Resistant Products

Typical Physical Properties		Note: The following technical information and data should be considered for informational purposes only and should not be used for specifications.				
Fasteners		SJ-3860/61/62	SJ-3586/87	SJ-3518/19	SJ-3486/87	SJ-3418/19
Description:		Dual Lock Fastener	Hook & Loop with PSA	Hook & Loop with PSA	Hook & Loop Plain Back	Nylon Hook & Loop Plain Back
Fastener Material:		Polyolefin Black	Polyester	Nylon	Polyester	Nylon
Adhesive:		3M™ VHB™ Tape (Clear) Similar to Tape 4920	Rubber	Rubber	None	None
Liner:		Clear with 3M logo	White with 3M logo	White with 3M logo	None	None
Engaged Thickness:						
Nominal	in. (mm)	0.18 (4.6)	0.17 (4.3)	0.15 (3.8)	0.13 (3.3)	0.13 (3.3)
Tolerance		± 15%	± 20%	± 20%	± 20%	± 20%
Mated Weight - without liner:	grams/6.4cm ²	2.0	1.1	0.80	0.45	0.45
Flame Resistance:						
FAR 25.853 (Unmated)						
12 Second Vertical: para (a) (1) (ii)						
Spec (max)	Test					
(8.0 in.)	Burn Length	Does not	2.7 in.	2.7 in.	3.9 in.	3.2 in.
(15 sec.)	Ext. Time	pass	6.7 seconds	6.7 seconds	7.3 seconds	1.2 seconds
(3 sec.)	Drip Ext. Time		1 second	1 second	3 seconds	0 second
60 Second Vertical: para (a) (1) (i)						
Spec (max)	Test					
(6.0 in.)	Burn Length	3.3 in.	3.8 in.	3.7 in.	4.8 in.	4.2 in.
(15 sec.)	Ext. Time*	0.3 seconds	0 second	0 second	0 second	0 second
(3 sec.)	Drip Ext. Time	0 seconds	1 second	0 second	3 seconds	0 second
*Extinguish time refers to the time it takes the burning matter to extinguish after the flame source is removed. Most of our flame resistant products actually stop burning even though the 60 second source flame is still ignited. (All products were tested unattached to substrates.)						
Solvent and Fuel Resistance:		No apparent visual degradation	No significant degradation except in MEK, Acetone, and Ammonia	No significant degradation except in MEK, Acetone, and Ammonia	N/A	N/A
Splash testing cycle - 20 seconds submersion, 20 seconds air dry - 3 cycles.						
No apparent degradation of Dual Lock Industrial Fastener when exposed to splash testing with many common solvents and fuels including gasoline, JP-4 jet fuel, mineral spirits, motor oil, ammonia cleaner, acetone, and methyl ethyl ketone (MEK).						
Plasticizer Resistance:		Yes	No	No	N/A	N/A
1 Week @ 158°F to highly plasticized vinyl.						
Shelf Life:		18 months from the date of manufacture when stored in original packaging at 70°F (21°C) and 50% Relative Humidity (R.H.).				
Long Term Static Load:		Conditions such as elevated temperatures, jarring, vibration, etc. can affect long term performance. The user should design the amount of fastening area based on the specific conditions in the application. Four square inches of fastening area per pound of static load is suggested as a starting point for such evaluation.				

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Typical Performance Characteristics

Note: The following technical information and data should be considered for informational purposes only and should not be used for specifications.

Fasteners	SJ-3860/61/62	SJ-3586/87	SJ-3518/19	SJ-3486/87	SJ-3418/19	
Construction:	Dual Lock Fastener	Polyester Hook & Loop with PSA	Nylon Hook & Loop with PSA	Polyester Hook & Loop Plain Back	Nylon Hook & Loop Plain Back	
Dynamic Closure						
Tensile Mode	Dual Lock Fastener					
Initial Engagement:	Combination					
 lbs _F /in ² (k N/m ²)	250 to 250: 170 to 400: 250 to 400:	9-21 (62-145) 8-24 (55-166) 40-50 (276-345)	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Initial Disengagement						
Tensile Mode:	Dual Lock Fastener					
Dual Lock Fastener	Combination					
 lbs _F /in ² (k N/m ²)	250 to 250: 170 to 400: 250 to 400:	35-45 (242-311) 30-40 (207-276) 45-55 (311-380)				
Scotchmate Fastener						
lbs _F /in ² (k N/m ²)		11.3 (77.9)	8.0 (55.1)	11.3 (77.9)	8.0 (55.1)	
System Static Shear:						
 grams/6.45cm ² :	-20°F (-29°C) Stainless 72°F (22°C) Steel 100°F/100% RH 120°F (49°C) 200°F (93°C)	2000g/sq in 1500g/sq in 750g/sq in 1000g/sq in 500g/sq in	2000g/sq in 1000g/sq in 250g/sq in 500g/sq in Not suggested	2000g/sq in 500g/sq in 200g/sq in** 200g/sq in Not suggested	Not Applicable	Not Applicable
**Adhesion to Polyethylene.						
Static Tensile Adhesion:						
 grams/6.45cm ² :	-20°F (-29°C) Aluminum 72°F (22°C) 100°F/100% RH 120°F (49°C) 200°F (93°C)	2000g/sq in 2000g/sq in 1000g/sq in 1000g/sq in 500g/sq in	1500g/sq in 1000g/sq in 150g/sq in 400g/sq in Not suggested	1500g/sq in 500g/sq in 150g/sq in** 300g/sq in Not suggested	Not Applicable	Not Applicable
**Adhesion to Polyethylene.						
Test Criteria for System Static Shear and Static Tensile:	Samples tested held the listed weight at listed temperature for 10,000 minutes.					
Temperature Tolerance:						
Short-Term/Intermittent	°F	-20 to 200	-20 to 158	-20 to 158	-20 to 250	-20 to 250
	°C	(-29 to 93)	(-29 to 70)	(-29 to 70)	(-29 to 121)	(-29 to 121)
Temperature Tolerance:						
Long-Term/Continuous	°F	-20 to 158	-20 to 120	-20 to 120	-20 to 250	-20 to 250
	°C	(-29 to 70)	(-29 to 49)	(-29 to 49)	(-29 to 121)	(-29 to 121)
Test Criteria for Continuous Performance:	Samples hold at least 500 g/inch in system static shear for 10,000 minutes.					
Dynamic Peel Adhesion:						
Adhesion to Stainless Steel	90° Peel Adhesion lb/in width (N/cm width)					
1 Week at:						
72°F/50% RH	8.7 (15.4)	14.3 (25.1)	10.3 (18.1)	Not Applicable	Not Applicable	
100°F/100% RH	12.4 (21.8)	9.1 (16.0)	5.5 (9.64)			
158°F	9.8 (17.2)	14.8 (26.1)	11.9 (21.0)			

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Rail Transit
(Typical Test Data)

Note: The following technical information and data should be considered representative or typical only and should not be used for specifications. The products listed below are tested annually for conformance to the following tests. Copies of the test data are available upon request.

Fasteners	SJ-3860/61/62	SJ-3518/19		
Environmental Cycle Test:				
Peel Adhesion to:	lb/inch width (N/cm width)			
Royalite R61	13.6 (23.9)	9.9 (17.5)		
Steel	12.7 (22.3)	12.2 (21.6)		
Aluminum	10.7 (18.8)	12.0 (21.2)		
Environmental Cycle Test Conditions:	Initial: After 72 hours dwell on test panel at 72°F (22°C). After Environmental Cycling on test panel: 72 hours at 158°F (70°C), then 24 hours at 100°F (38°C) and 100% relative humidity, then 8 hours at -20°F (-29°C), then 40 hours at 158°F (70°C), then 24 hours at 100°F (38°C) and 100% relative humidity, then 72 hours at -20°F (-29°C), then 24 hours at 72°F (22°C), then test 90° peel adhesion.			
Tensile-Pull Adhesion Strength to Transit Car Panels:				
% of Disengagement force of Fastener	Royalite R61			
250 to 250	280%		Not Tested	
170 to 400	320%			
250 to 400	224%			
ASTM E162 Surface Flammability Flame Spread Index (I_s) max = 35	SJ-3860	SJ-3861	SJ-3862	SJ-3518/19
	6.0	3.5	5.3	Not Tested
ASTM E662 Smoke Generation				
Flaming Mode				Flaming mode:
Ds (1.5) = 100 max	5.7	6.8	11.7	Ds (4.0)
Ds (4.0) = 200 max	72.3	72.6	64.1	123.1
Non-Flaming Mode				
Ds (1.5) = 100 max	0.3	0.2	0.2	
Ds (4.0) = 200 max	22.5	23.9	25.0	
Concentration of Selected Combustion Products During Testing Under BSS 7239 Flaming Exposure Mode [Detection Limit, ppm]	Test Chamber Concentration at 4 min. (ppm)*		Test Chamber Concentration at 4 min. (ppm)**	
HCN [2]	1		5	
HCl [1]	1		ND	
NO _x [2]	ND		5	
SO ₂ [0.5]	ND		0.5	
CO [10]	100		100	
HF [1.5]	ND		ND	

Note: The values presented above represent results from this one industry test. They do not represent the concentrations of all possible combustion products of these fasteners.

*Product tested was Fastener SJ-3860.

**Both Fasteners SJ 3518 and SJ-3519 were tested.

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**Boeing Material
Specification
(BMS 8-825F)
Typical Test Data**

Note: The following technical information and data should be considered representative or typical only and should not be used for specifications. The products listed below are tested annually for conformance to the following tests. Copies of the test data are available upon request.

Property	Pressure Sensitive Fasteners		Plainback Fasteners		
	Reference to BMS 8-285F*	SJ-3586 (Hook)	SJ-3587 (Loop)	SJ-3486 (Hook)	SJ-3587 (Loop)
Weight, lb/ft² (Mated)	Max 0.35 Adhesive Backed Max 0.16 Non-Adhesive	0.34		0.15	
Flammability - 12 sec. vertical	Maximum				
Hook or Loop					
Burn Length (inches)	8	2.8	2.7	3.9	3.3
Extinguish Time (seconds)	15	6.7	7.3	7.3	3.0
Drip Ext. Time, (seconds)	5	1.0	1.0	2.0	3.0
Hook and Loop, Mated					
Burn Length (inches)	8	0.7		2.2	
Extinguish Time (seconds)	15	5.7		3.0	
Drip Ext. Time, (seconds)	5	2.0		2.0	
Flammability - 60 sec. vertical	Maximum				
Hook or Loop					
Burn Length (inches)	6	3.3	3.8	4.6	4.8
Extinguish Time (seconds)	15	0.0	0.0	0.0	0.0
Drip Ext. Time, (seconds)	5	1.0	1.0	2.0	3.0
Tensile Shear Strength, lbs_F/in²	14 (ave. min)	25.3 Average		25.3	
T-Peel lbs/inch - width,	0.5 (ave. min)	2.0 Integrated Average		2.0	
Tension - lbs_F/in²	7 (ave. min)	9.5 Average		9.5	
Adhesion Creep (inches)	Maximum 1.0	< 1"		—	
Peel Strength lbs/inch width	Minimum				
72°F/50% R.H.	12	15.0	14.8		
160°F	12	17.0	16.5		
120°F/100% R.H.	12	15.2	14.1		
-65°F	12	14.8	14.3		

*Boeing Material Specification 8-285F.

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Available Sizes All of these fire resistant products are supplied on 50 yard rolls on a 3" i.d. paper core. Maximum widths available are 4" and other widths may be available upon request. Typical width tolerance is $\pm 1/32$ ".

Application Considerations **Pressure Sensitive Adhesive Attachment**
Dual Lock and Scotchmate Industrial Fasteners supplied with unique pressure sensitive adhesive backings can be conveniently bonded to a wide variety of materials, including but not limited to the following:

	SJ-3860/61/62	SJ-3586/87	SJ-3518/19	SJ-3486/87	SJ-3418/19
Bare Metals	✓	✓	✓	—	—
Painted Metals	✓	✓	✓	—	—
Fiberglass	✓	✓	✓	—	—
Structural Composites	✓	✓	✓	—	—
Glass	✓	✓	✓	—	—
Sealed Wood	✓	✓	✓	—	—
Powder Paint	—	✓	✓	—	—
ABS	✓	✓	✓	—	—
Acrylic	✓	✓	✓	—	—
Polycarbonate	✓	✓	✓	—	—
Polystyrene	✓	✓	✓	—	—
Rigid Vinyl	✓	✓	✓	—	—
Plasticized Vinyl	✓	—	—	—	—
Polyethylene	—	✓	✓	—	—
Polypropylene	—	✓	✓	—	—

- Application Techniques**
- To obtain optimum bond to any substrate, apply to a clean and dry substrate above 68°F (20°C). All substrates must be clean, dry, and free of oil, grease, dust, etc. Remove protective liner and press firmly onto the substrate for full surface contact. Use of a roller to help ensure full contact of adhesive on substrate is recommended.
 - When applying Dual Lock Flame Resistant Fasteners, which has less adhesive thickness than standard Dual Lock Fasteners, it is even more important to carefully observe these application guidelines to ensure good adhesive contact to substrate.
 - Adhesive bond strength increases with time, as the adhesive flows into the substrate structure. Handling strength is achieved immediately. For SJ-3860/61/62 at room temperature, approximately 50% of ultimate bond strength is achieved in the first 20 minutes, 90% after about 24 hours and 100% after about 72 hours. For the Scotchmate adhesive backed products 100% of ultimate bond strength is achieved within the first 24 hours.

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Attachment Guide

This information is intended to assist the designer considering Dual Lock and Scotchmate Industrial Fasteners. Actual product performance will depend on a variety of factors including the fasteners selected, the conditions in which the fastener is applied, and the time and environmental conditions in which it is expected to perform. Because many of these factors are uniquely within the user's knowledge and control, it is essential that the user evaluate the fastener to determine whether it is fit for a particular purpose and suitable for the user's method of application.

Application Ideas

For additional application suggestions, contact your local 3M sales representative, or the toll free 3M sales assistance number at 1-800-362-3550.

**Recognition/
Certification**

MSDS: 3M has not prepared a MSDS for this product which is not subject to the MSDS requirements of the Occupational Safety and Health Administration's Hazard Communication Standard, 29 C.F.R. 1910.1200(b)(6)(v). When used under reasonable conditions or in accordance with the 3M directions for use, the product should not present a health and safety hazard. However, use or processing of the product in a manner not in accordance with the directions for use may affect its performance and present potential health and safety hazards.

TSCA: This product is defined as an article under the Toxic Substances Control Act and therefore, it is exempt from inventory listing requirements.

3M™ Dual Lock™ and 3M™ Scotchmate™ Reclosable Fasteners Flame Resistant Products

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.

Important Notice

3M MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. User is responsible for determining whether the 3M product is fit for a particular purpose and suitable for user's method of application. Please remember that many factors can affect the use and performance of a 3M product in a particular application. The materials to be bonded with the product, the surface preparation of those materials, the product selected for use, the conditions in which the product is used, and the time and environmental conditions in which the product is expected to perform are among the many factors that can affect the use and performance of a 3M product. Given the variety of factors that can affect the use and performance of a 3M product, some of which are uniquely within the user's knowledge and control, it is essential that the user evaluate the 3M product to determine whether it is fit for a particular purpose and suitable for the user's method of application.

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ISO 9002

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

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Bonding Systems Division

3M Center, Building 220-7E-01
St. Paul, MN 55144-1000



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