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Scotchmate™ Reclosable Fasteners

SJ3522 and SJ3523

Nylon Hook and Loop

Plasticizer resistant adhesive

Product Information

April, 2006

Product Description

3M™ Scotchmate™ Reclosable Fasteners offer advanced closure alternatives to zippers, screws, snaps, hooks, bolts and more. They offer greater design flexibility, faster product assembly, smoother and cleaner exterior surfaces and improved product performance in many applications. The hook and loop fasteners consist of two strips of nylon fabric which engage to form a quick fastening attachment. Simply pull the strips apart by hand to disengage.

The woven hook is covered with small, stiff hooks, about 300 per square inch (46/sq. cm.). The woven loop is covered with thousands of soft, pliable napped loops, providing for thousands of openings and closings (cycles). The hook and loop are preshrunk to insure maximum dimensional stability and flatness.

These Scotchmate reclosable hook and loop fasteners are coated on the backside with a plasticizer resistant acrylic pressure sensitive adhesive. This adhesive is especially suited for attachment to flexible vinyl and other plasticized materials.

Product Construction

Note: The following technical information and data should be considered representative or typical only and should not be used solely for setting specifications.

	3M™ Scotchmate™ Reclosable Fasteners		
	SJ3522 (Hook)	SJ3523 (Loop)	
Material of Construction	Fastener Backings Adhesive	nylon 6 nylon 6 Transparent clear acrylic	nylon 6,6
Standard Colors^(a)	Black and White		
Thickness^(b) max. unmated	3/32" (2.4 mm)	4/32" (3.2 mm)	
Selvage Edge^(c) In. (mm) ± 1/32" (0.8 mm)	3/32" (2.4 mm) 4/32" (3.2 mm) for 4" wide		
Weight oz/in² (g/cm²) without liner	0.015 oz/in ² (0.063 g/cm ²)	0.014 oz/in ² (0.059 g/cm ²)	
Liner	Clear, non-printed, polyethylene film (3.5 mil)		

- a) Other colors are available as special orders. 3M recommends the user evaluate a color sample to see if it meets their color and expected use requirements. See your 3M authorized distributor or 3M representative for color selection guide and minimum requirements.
- b) Thickness was measured using a 1/2" pressure foot supporting a 34 gram weight. Actual thickness will decrease when a load is applied, compressing the product, or will increase if there is no load, or a load is removed.
- c) See table on page 5 for selvage edge and extended liner configurations available for various product widths.

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Typical System Performance Properties and Characteristics^(a)

Note: The following information is not product release requirements, nor product specification limits. Rather, this data represent typical performance using standard test methods. This is intended for use as a guide to assist in selection of 3M™ Scotchmate™ Reclosable Fasteners for further evaluation. Customer specifications should not be based solely on the data presented in this document.

Unless stated, typical system performance characteristics were measured under controlled laboratory conditions of 72°F (22°C) and 50% relative humidity. The user should evaluate products in the actual application to ensure suitable performance for the intended use.

System Performance		
	3M™ Scotchmate™ Reclosable Fasteners SJ3522 Hook engaged to SJ3523 Loop	SJ3523 Loop engaged to Dual Lock™ SJ3560 ^(b)
TENSILE (Rigid to Rigid Substrates)	lbs _f /sq inch (Newtons/cm ²):	
Dynamic Tensile Engagement Strength	< 1.0 (0.69)	< 1.0 (0.69)
Dynamic Tensile Disengagement ^(c)	16.5 (11.4)	49.1 (33.9)
Static Tensile Holding Strength	Holds 1.1#/in ² (77.5 grams/cm ²) for indicated time and temperature	
120°F (49°C)	4,600 minutes	5,000 minutes
158°F (70°C)	600 minutes	1,000 minutes
200°F (93°C)	150 minutes	50 minutes
100°F/100% RH (38°C/100% RH)	7,000 minutes	5,750 minutes
SHEAR (Rigid to Rigid Substrates)	lbs _f /sq inch (Newtons/cm ²):	
Dynamic Shear (1" x 1" overlap) ^(c)	30.7 (21.1)	105 (72.5)
Static Shear Holding Strength	Holds 1.1#/in ² (77.5 grams/cm ²) for indicated time and temperature	
120°F (49°C)	10,000 minutes	10,000 minutes
158°F (70°C)	9,000 minutes	6,000 minutes
200°F (93°C)	600 minutes	600 minutes
100°F/100% RH (38°C/100% RH)	10,000 minutes	10,000 minutes
INITIAL PEEL AND CLEAVAGE^(a,c)	Pounds/inch width (kilograms/cm width)	
"T" Peel Strength (Flexible to Flexible)	4.0 (0.70)	9.2 (1.6)
90° Peel Strength (Flexible to Rigid)	1.6 (0.28)	4.8 (0.85)
Cleavage Peel Strength (Rigid to Rigid)	9.6 (1.7)	22.6 (4.0)
ENGAGED THICKNESS^(d)	Inches (cm) ± Tolerance	
(Nominal without liner)	0.13 (0.33) ± 15%	0.21 (0.53) ± 15%
CLOSURE CYCLE LIFE^(e)	5,000	50
SHELF LIFE	Twenty four months from date of manufacturing when stored in original packaging at 72°F (21°C) and 50% relative humidity.	

Note: Long Term Static Load: Conditions such as temperature variations, engagement area, closure pressure and vibrations or side to side movement after engagement or exposure to prolonged periods of moisture, ultraviolet or other environmental factors can affect the closure strength and long term static load performance. Reclosable fasteners may slip or creep in the direction of the static load forces when subjected to static loads at temperatures or weights greater than indicated. The user is responsible for designing the amount of fastening area based upon the specific conditions for the application. Four square inches (57.3 sq. cm/ kilogram) of fastening area per pound of static load is suggested as a starting point for such evaluations.

- a) System performance tests are determined by measuring the performance of the entire mated reclosable fastener system consisting of two non-anodized aluminum plates joined together with the indicated fasteners. The "T" peel test only measures the closure performance per ASTM D5170 and was not adhered to aluminum panels. The 90° peel has one of the mated fasteners attached to a non-anodized aluminum panel, while the other mated fastener is not attached to an adherend and is disengaged at 90° angle during the peel.
- b) The use of 3M™ Scotchmate™ Loop Reclosable Fasteners engaged to 3M™ Dual Lock™ Reclosable Fasteners provides increased strength over standard Scotchmate reclosable fasteners. Scotchmate to Dual Lock combinations provide a limited number of reclosures compared with Scotchmate systems. Due to the very high strength of Scotchmate reclosable fasteners mated to Dual Lock reclosable fasteners, extra care should be given to ensure the maximum bond strength is obtained to the adherends being joined. Failure to obtain bond strengths sufficiently high to the adherend may cause the fastener to release.
- c) 3M™ Scotchmate™ Reclosable Fasteners SJ3522 and SJ3523 and 3M™ Dual Lock™ Reclosable Fastener SJ3560 are engaged with firm pressure and disengaged, peeled or cleaved at the rate of 12 inches (305 mm) per minute.
- d) The engaged thickness was measured using a 0.5" diameter pressure foot supporting a 34 gram weight. Engaged thickness, per given fastener area, will decrease when compressed or increase with no load or when the engaged fasteners are separated in tensile.
- e) Cycle Life is the number of cycles (openings and closings) that the fastener is subjected to while maintaining 50% or greater of the original peel values.

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Additional Performance Characteristics

Solvent Resistance: The nylon components resist incidental attack by most common solvents and alkaline solutions. Acid solutions may cause deterioration of the fastener. The adhesive on 3M™ Scotchmate™ Reclosable Fasteners SJ3522 and SJ3523 have not been tested after exposure to many common organic solvents and transportation fluids (gasoline, motor oil, etc.). If increased solvent resistance is desired the customer is directed to evaluate 3M™ Scotchmate™ Reclosable Fasteners SJ3571 or SJ3572 or many of our 3M™ Dual Lock™ Reclosable Fastener products to determine if the actual adhesive performance meets the requirements of their application.

Plasticizer Resistance: The adhesive on Scotchmate reclosable fasteners SJ3522 and SJ3523 has good resistance to many plasticizers found in common flexible vinyl and other materials, resulting in retained adhesive strength and performance with time compared to rubber based adhesives. Scotchmate reclosable fasteners SJ3522 and SJ3523 are suggested for adhering to plasticized materials. Many of our Dual Lock reclosable fasteners products can also be evaluated to determine if the adhesive performance meets the requirement of the end use application.

Flammability Resistance: Scotchmate reclosable fasteners SJ3522 and SJ3523 will not pass common flammability tests when tested unattached. If you need 3M Reclosable Fasteners to meet many of the standard flammability tests (such as FAR 25.853, FMVSS-302, ASTM E-162, ASTM E-662, BSS-7239 and others), it is suggested that you refer to the product selection guide “3M™ Flame Resistant Reclosable Fasteners”.

Environmental Effects: Temperatures down to -20°F (-29°C) increases the typical closure strengths. The adhesive on Scotchmate reclosable fasteners SJ3522 and SJ3523 is formulated to withstand typical indoor conditions temperature, humidity and ultraviolet exposure conditions. If your application requires increased outdoor performance review the Scotchmate reclosable fastener Polyester or Nylon or Dual Lock reclosable fastener product selection guide to determine products that may meet your requirements.

Water (Humidity) Resistance: Closure strength of nylon hook and loop fasteners decreases after prolonged exposure to water due mainly to water absorption by the cut nylon ends for hook products. Closure strength is regained when dried. Review the product selection guide 3M™ Scotchmate™ Polyester Hook and Loop Reclosable Fasteners or 3M™ Dual Lock™ Reclosable Fasteners for products with greater resistance of the closure to moisture. Once bonded the adhesive has high resistance to moisture under typical use conditions.

Volatile Outgassing: Volatile outgassing, as per ASTM E595, is one important test in determining the suitability of materials for usage within spacecraft. Generally products with acrylic or no adhesive have lower volatile outgassing values. Scotchmate reclosable fasteners SJ3522 and SJ3523 have not been tested to ASTM E595. Products tested at the Goddard Space Flight Center can be found at the following web site: <http://outgassing.nasa.gov/>

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**Additional
Performance
Characteristics
(continued)**

Sterilization/Autoclaving: 3M™ Scotchmate™ Reclosable Fasteners SJ3522 and SJ3523 have not been tested to performance after gas or steam sterilization, or autoclaving.

Washing and Dry Cleaning: Washing or dry cleaning of these products is not recommended due to the potential for adhesive softening that could transfer adhesive residues to other materials, or reduce long term performance.

Fungus Resistance:

Mil standard 810F, Method 508.5: Three samples from 1 lot of Scotchmate reclosable fasteners SJ3522 and SJ3523 were exposed to five fungal organisms (*Aspergillus versicolor* – ATCC 11730, *A. flavus* – ATCC 9643, *A. niger* – ATCC 9642, *Penicillium funiculosum* – ATCC 11797, and *Chaetomium globosum* – ATCC 6205) and gave an average fungal growth rating after 44 days of 2.3 for SJ3522 and 2.0 for SJ3523.

ASTM G21-96 “Fungal Challenge Test”: Three samples from 1 lot of Scotchmate reclosable fasteners SJ3522 and SJ3523 were exposed to five fungal organisms (*Aspergillus niger* – ATCC 9642, *Penicillium funiculosum* – ATCC 11797, *Chaetomium globosum* – ATCC 6205, *Trichoderma virens* ATCC 9645 and *Auerobasidium pullulans* ATCC 15233). SJ3522 had an average fungal growth of 2.3 after 7, 14, 21 and 28 days, whereas SJ3523 gave an average rating of 2.0, 2.3, 2.3 and 2.3 for the same time periods.

Static Discharge: Scotchmate reclosable fasteners SJ3522 and SJ3523 have not been tested for static charge released during liner removal, closure opening nor adhesive removal from the adherend once a fastener has been applied. If your application requires use of these fasteners in areas where static discharge is of a concern, the fasteners should be tested under expected use conditions.

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Roll Lengths ^(a) and Colors ^(b) – Yards (Meters)				
3M™ Scotchmate™ Reclosable Fasteners				
Standard Sizes Available ^(c)			SJ3522 (Hook)	SJ3523 (Loop)
Widths in. ± 1/16" (mm) ± 1.6	Selvage Edge ^(d)	Extended Liner ^(d)	50 (45.7)	50 (45.7)
1/2" (12.7 mm)	One Edge	One Edge	BK	BK
5/8" (15.9 mm)	One Edge	One Edge	BK, W	BK, W
3/4" (19 mm)	One Edge	One Edge	BK, W	BK, W
1" (25.4 mm)	One Edge	One Edge	BK, W, OR	BK, W, OR
1 1/2" (38.1 mm)	Two Edges	Two Edges	BK	BK
2" (50.8 mm)	Two Edges	Two Edges	BK, W	B, BK, W
3" (76.2 mm)	One Edge	One Edge	BK	–
4 (101.6 mm)	Two Edges	Two Edges	BK	BK

a) 3M™ Scotchmate™ Reclosable Fasteners SJ3522 and SJ3523 are available on a 3" fiber core. The diameter of the side shield is 17.5 inches (44.5 cm) and the width of the roll with the side shield is the product width plus 1/4". Contact your authorized 3M distributor or 3M representative for details on supplying widths not listed above or special sizes.

b) Standard colors are white (W) and black (BK). Orange (OR) is available in 1" width and beige (B) is available for 2" wide loops. Other colors are available as special orders. 3M recommends before placing an order, that the user evaluate a color sample to determine if the color meets their total use needs. Contact your local 3M distributor or 3M representative for a color selection guide, minimum order quantities and lead times.

c) 3M™ Reclosable Fasteners can be fabricated in many custom shapes and sizes to fit your product design and manufacturing process. Some standard shapes and sizes are listed below. For others not listed please contact your local 3M authorized converter or 3M representative for additional options, configurations and ordering information.

d) Selvage edges and extended liner availability. Other configurations may be possible as a special order.

Product Number	Fabricated Forms
SJ3522	1" x 2" black pre-cut hook with liner. 1,000 pieces per case.
SJ3522/23	1" x 4" orange pre-mated samples with liner. 1,000 pre-mated pieces per case.

Attachment Techniques

The following information is intended to assist the designer considering the use of adhesively coated 3M™ Scotchmate™ Reclosable Fasteners. System product performance depends upon a number of factors, including the fastener (material, adhesive, and area), application method, adherend surface characteristics (material, texture and cleanliness), environmental conditions (moisture, ultraviolet and temperature exposure) plus the time it is expected to support a given load. Because many of these factors are uniquely within the user's knowledge and control, it is required that the user evaluate 3M products to determine whether they are fit for a particular purpose and suitable for the user's substrates, method of application and desired end use.

Design Considerations: As a general rule, four square inches of fastener area per pound (57.3 square centimeters per kilogram) of static load to be supported is suggested as a starting point for evaluation. More or less area may be needed depending on specific conditions or end use applications.

Rounding the corners, slightly recessing the product into the substrate or providing raised edges around the reclosable fastener can reduce the possibility of edge lifting and improve the overall appearance of the fastener on the finished product. Mechanically securing the corners of the fastener with rivets, staples, screws, etc. may also reduce the possibility of edge lifting, but may reduce the closure performance.

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Attachment Techniques (continued)

The two most common techniques for attaching 3M™ Scotchmate™ Reclosable Fasteners to various surfaces are summarized below. For complete details on techniques and options for attaching 3M™ Scotchmate™ or Dual Lock™ Reclosable Fasteners please see the technical bulletin “Attachment of 3M™ Scotchmate™ and Dual Lock™ Reclosable Fasteners”.

1) Pressure Sensitive Adhesive attachment: The use of pressure sensitive adhesives eliminates or reduces the need for sewing, solvent activation, dielectric or ultrasonic bonding or bulk adhesive bonding. This can result in simplicity, and lower installation costs. Pressure sensitive adhesive products can be applied manually or automatically using a variety of equipment choices. Contact your 3M sales representative or 3M authorized distributor to discuss automated equipment options.

Adherend Surface Preparation: Highly textured adherend surfaces may reduce the ultimate adhesion levels and care should be given to minimize the surface texture or roughness. Adhesive backed Scotchmate reclosable fasteners should be applied to surfaces that are clean, dry and free of oil, grease, dust, mold release agents or surface contaminants that could reduce adhesion. It is recommended to remove any surface contaminants that may reduce adhesion by using a method suited for the type and quantity of surface contaminants present.

Note: It is important the customer follow all manufacturer’s precautions and directions for use as well as any specific government regulations or customer requirements for the method(s) used to remove any contamination on the surface of the adherend or preparing the surface for attaching the fastener(s).

In exceptional cases, especially when removing silicone mold release agents or on rough, porous surfaces, it may be necessary to lightly abrade the surface, use an adhesion promoter or a surface sealer to optimize the adhesive bond to the adherend. The selection of abrasion, priming or sealing methods will depend upon the adherends and the environmental conditions the product will be exposed to during use.

Attachment Procedure: To obtain an optimum bond to any surface, both the fasteners and the target surfaces should have equilibrated for a minimum of 1 hour at temperatures between 68°F (20°C) to 100°F (38°C) before application. The liner protecting the adhesive is removed and preferably without touching the adhesive, the fastener is applied to the adherend to obtain initial surface contact between the adhesive and adherend. Exposure of the adhesive to ambient conditions without the protective liner, before applying to the surface, should be minimized as initial adhesive tack may decrease. Flexible adherends should be lying on a hard flat surface so as to permit uniform adhesive contact with the surface. Use of a rubber hand roller, press platen or similar device is recommended to ensure full adhesive contact with the adherend surface. Approximately 4.5 pounds of force per square inch (310 grams per square centimeter), is recommended to increase adhesive contact, improving bond strength. For all adhesive applications, it is important to ensure that the edges are rolled down to reduce the change of edge lifting.

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Attachment Techniques (continued)

Dwell Time before Handling or Applying a Load: Parts with properly chosen and applied pressure sensitive adhesive reclosable fasteners can be handled immediately. As the adhesive further wets-out the adherend surface, adhesive bond strength increases after application with time, pressure and/or temperature. Once attached to the adherend, a 1-day minimum dwell time is recommended before applying a load or disengaging mated Scotchmate reclosable fastener pieces. This dwell time is important for achieving a firm adhesive bond before applying a load or using. The adhesive on 3M™ Scotchmate™ Reclosable Fasteners SJ3522 and SJ3523 achieves approximately 50% of the ultimate bond strength within 1 hour, 90% after 1 day and the ultimate bond strength of properly applied fasteners is obtained within 3 days at 72°F (22°C) and 50% relative humidity. Primers or adhesion promoters may reduce the time required to achieve the ultimate bond strength.

2) Mechanical Attachment: Scotchmate reclosable fasteners SJ3522 and SJ3523 may also be mechanically attached to difficult to adhere to surfaces such as textured plastics and wood by using staples, screws, rivets and similar methods. The head of the mechanical fastener should be flat and large enough to resist pull through when the fastener is disengaged. The head of the fastener should also be recessed as much as possible below the surface of the hook or loop to prevent interference with (dis)engagement properties.

The use of resin coated chisel divergent staples appear to provide excellent attachment to thick sections of soft and hardwood substrates.

Application Ideas

Scotchmate reclosable fasteners SJ3522 and SJ3523 can provide a firm adhesive bond to a wide variety of surfaces, including, but not limited to those listed below. Because product performance will depend on actual conditions within any specific application, it is essential that the user evaluate the 3M product to determine whether it is fit for a particular material purpose and suitable for the user's method of application.

Plastics

CARC Paint	Bare and painted Metal	Acrylic	ABS
Glass	Sealed Wood	Polycarbonate	Polystyrene
		Flexible & Rigid Vinyl	Plasticized plastics

Scotchmate reclosable fasteners SJ3522 and SJ3523 may be useful for:

Anti-scratch surface	Attaching accessories and equipment
Medical Braces	Vibration and sound dampening control
Attaching Exhibit and Display Graphics	

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Certification/ Recognition

MSDS: An MSDS for these products are available upon request via the address below. 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: These products are defined as an article under the Toxic Substances Control Act and therefore, are exempt from inventory listing requirements.

Mil Spec. MIL-F-21840: 3M™ Scotchmate™ Reclosable Fastener SJ3522 meet the physical requirements of Military Specification MIL-F-21840, Type II and III, Class 1 hook. 3M™ Scotchmate™ Reclosable Fastener SJ3523 meets the physical requirements MIL-F-21840 Class 1 or Class 5 loop. The Class 5 loop needs to be engaged with an all polyester hook, such as our 3M™ Scotchmate™ Polyester Hooks.

C.I.D. A-A-55126A: This C.I.D. has lower performance requirements than MIL-F-21840. 3M currently does not certify to this C.I.D. as it contains errors and omissions preventing reliable product testing.

Product Use

All statements, technical information and recommendations contained in this document are based upon tests or experience that 3M believes are reliable. However, many factors beyond 3M's control can affect the use and performance of a 3M product in a particular application, including the conditions under which the product is used and the time and environmental conditions in which the product is expected to perform. Since these factors 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.

Warranty and Limited Remedy

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ISO 9001:2000 - ISO/TS 16949:2002

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