Dual Lock™ Reclosable Fasteners

SJ3540 (Type 250)*
SJ3541 (Type 400)
SJ3542 (Type 170)

Technical Data **November, 2002**

Product Description

3M™ Dual Lock™ 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 fasteners consist of continuous strips of polyolefin with polyolefin stems having a mushroom shaped top. The mushroom heads allow the fasteners to easily slide over each other allowing positioning of parts before they are snapped together creating a firm fastening attachment. Simply peel the pieces apart by hand to disengage.

3M™ Dual Lock™ Reclosable Fasteners SJ3540, SJ3541 and SJ3542 all contain a synthetic rubber based adhesive on a 1/32" conformable polyethylene foam backing covered by a liner. This construction allows for better contact with substrates having slight texturing or surface irregularities.

This product construction is especially suited to indoor applications or where elevated temperatures are not experienced. Suggested combinations of mated fasteners are Type 170 to Type 250, Type 170 to Type 400, Type 250 to Type 250, Type 250 to Type 400, or for a quick grab attachment with high strength but limited cycle life any of the Dual Lock products can be mated with 3M™ Scotchmate™ Loop Reclosable Fasteners. See the technical bulletin on attachments (70-0709-3929-6).

*Type 170 (approximately 170 stems per square inch)
Type 250 (approximately 250 stems per square inch)
Type 400 (approximately 400 stems per square inch)

Product Construction

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

Fastener Products	Dual Lock SJ3540 (Type 250)	Dual Lock SJ3541 (Type 400)	Dual Lock SJ3542 (Type 170)
Material of Construction			
Stem/Heads	Polypropylene		
Backing	Polypropylene		
Adhesive	Synthetic Rubber on Polyethylene Foam		
Standard Color	Black		
Thickness[(a)] unmated ± 15%	0.14" (3.5 mm)	0.14" (3.5 mm)	0.14" (3.5 mm)
Selvedge Edges	None		
Weight[(a)]	0.064 oz/in^2 (0.28 g/cm^2)	0.068 oz/in^2 (0.30 g/cm^2)	0.057 oz/in^2 (0.25 g/cm^2)
Liner	White 5 mil (0.13 mm) thick silicone treated polyolefin liner.		

a) All thickness and weight values are with the liner removed.

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Typical System Performance Physical Properties and Performance Characteristics

Note: The following technical information and data is intended as a user guide representing typical performance and should not be used for specifications.

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

	System Performance[a]		
	3M™ Dual Lock™ Reclosable Fastener SJ3542 (Type 170) engaged to 3M™ Dual Lock™ Reclosable Fastener SJ3540 (Type 250)	**3M™ Dual Lock™ Reclosable Fastener SJ3540 (Type 250) engaged to 3M™ Dual Lock™ Reclosable Fastener SJ3541 (Type 400)**	**3M™ Scotchmate™ SJ3527 (loop) engaged to 3M™ Dual Lock™ Reclosable Fastener SJ3540 (Type 250)[b]**
TENSILE (Rigid to Rigid Substrates)	lbs_F/sq inch (kNewtons/m^2) @ 72°F/50% RH		
Dynamic Tensile Engagement Strength	15 (103)	40 (276)	<1 (<6.9)
Dynamic Tensile Disengagement[c]	35 (241)	66 (455)	35 (242)
Static Tensile Holding Power	Holds minimum 1.1 #/in^2 (77.5 grams/cm^2) for indicated time and temperature		
100°F/100% RH	20,000 minutes	20,000 minutes	20,000 minutes
120°F	20,000 minutes	20,000 minutes	20,000 minutes
140°F	10,000 minutes	10,000 minutes	3,000 minutes
158°F	1,000 minutes	1,500 minutes	275 minutes
SHEAR (Rigid to Rigid Substrates)	lbs_F/sq inch (kNewtons/m^2)		
Dynamic Shear (1" x 1" overlap)[c]	16 (110)	43 (298)	124 (855)
Static Shear Holding Power	Holds minimum 1.1 #/in^2 (77.5 grams/cm^2) for indicated time and temperature		
100°F/100% RH	7,200 minutes	10,000 minutes	10,000 minutes
120°F	10,000 minutes	10,000 minutes	10,000 minutes
140°F	45 minutes	10,000 minutes	10,000 minutes
158°F	33 minutes	47 minutes	1,000 minutes
PEEL AND CLEAVAGE[c]	Pounds/inch width (grams/cm width)		
Cleavage Strength (Rigid to Rigid)	17 (3040)	30 (5370)	14 (2500)
Peel Strength (“T” Peel, Flexible to Flexible)	0.7 (125)	1.4 (250)	4.1 (730)
Peel Strength (90° Peel, Flexible to Rigid)	1.8 (322)	5.4 (966)	6.1 (1090)
ENGAGED THICKNESS[d]	Inches (mm) ± Tolerance		
(Nominal without liner)	0.27 (6.8) ± 15%	0.27 (6.8) ± 15%	0.17 (4.4) ± 20%
CLOSURE CYCLE LIFE[e]	1,000	1,000	50
SHELF LIFE[f]	18 months	18 months	18 months

Note: Long Term Static Load: Conditions such as temperature variations, engagement area, or prolonged periods of exposure to environmental factors can affect the closure strength and long term static load performance. After engagement 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 of fastening area per pound of static load is suggested as a starting point for such evaluations.

a) The expected system performance of 3M™ Dual Lock™ Reclosable Fasteners is in approximately the following order of increasing strength: Dual Lock SJ3542 engaged to Dual Lock SJ3540 < (less than) Dual Lock SJ3542 engaged to Dual Lock SJ3541 ≈ (approximately equal to) Dual Lock SJ3540 engaged to Dual Lock SJ3540 < Dual Lock SJ3540 engaged to Dual Lock SJ3541. Dual Lock SJ3541 engaged to Dual Lock SJ3541 and Dual Lock SJ3542 engaged to Dual Lock SJ3542 are not recommended combinations.

b) Scotchmate loop engaged to Dual Lock provides increased strength over standard 3M™ Scotchmate Reclosable Fasteners. Due to this increased strength, extra care should be given to ensure the maximum bond strength is obtained to the substrates being joined. Failure to obtain bond strengths to the substrate that are sufficiently high may cause the fastener to release from the substrate upon disengagement.

c) Dual Lock SJ3540, SJ3541, SJ3542 and Scotchmate SJ3527 were engaged with firm pressure and disengaged, at the rate of 12 inches (305 mm) per minute.

d) Engaged thickness will decrease if a load is applied or increase if a separation force is applied.

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 tensile values.

f) Shelf life is from date of manufacture when stored in original packaging at 72°F (22°C) and 50% relative humidity.

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Additional Performance Characteristics

Note: The following technical information and data is intended as a user guide representing typical performance and should not be used for specifications.

Solvent Resistance: The polypropylene backing, stems and mushroom top resist attack by most common solvents and alkaline solutions. The adhesive on 3M™ Dual Lock™ Reclosable Fasteners SJ3540, SJ3541 and SJ3542 may be affected by some common laboratory solvents and transportation fluids (gasoline, motor oil, etc.) Tests should be conducted by the user to evaluate the solvents and exposure time expected for the actual application.

Plasticizer Resistance: The adhesive on Dual Lock SJ3540, SJ3541 and SJ3542 is not resistant to plasticizers found in many common flexible vinyls or other materials containing high levels of plasticizing materials. Tests should be conducted to evaluate the plasticizer resistance for the chosen application and environmental exposure and duration for the actual application. Products to evaluate for plasticizer resistance are 3M™ Dual Lock™ Reclosable Fasteners SJ3560, SJ3550CF or 3M™ Scotchmate™ Reclosable Fasteners SJ3522 and SJ3523.

Flammability Resistance: These products have not been tested to the FMVSS 302 flammability test. If your application requires a fastener to pass FMVSS 302, then 3M™ Dual Lock™ Reclosable Fasteners SJ3751, SJ3781 and SJ3752 are suggested. If you need reclosable fasteners that pass many of the other standard flammability tests (such as FAR 25.853, ASTM E-162, ASTM E-662, BSS-7239, etc.), it is suggested that you refer to the Flame Resistant Products data page. (70-0707-3992-8)

Environmental Effects: Temperatures down to -20°F (-29°C) increases the typical closure strengths. For long term exposure to sunlight or ultraviolet radiation these products should be placed between two opaque or UV resistant surfaces for best results. Increased resistance to ultraviolet exposure is available with our Dual Lock SJ3560 family of products. Specific testing under the expected environmental conditions is recommended.

Water (Humidity) Resistance: Closure strength should not be affected after prolonged exposure to water or humidity. Once bonded to the substrate the adhesive has good resistance to moisture under typical use conditions. Exposure to elevated heat and chlorine or bromine may compromise the adhesive performance to the 3M™ Dual Lock™ fasteners.

Volatile Outgassing: Volatile outgassing, as per ASTM E595, is one important test in determining the suitability of materials for spacecraft. Generally these products are not recommended for this application. If low volatile outgassing is a requirement it is suggested that our line of plainbacked or acrylic adhesive backed products be evaluated. Products tested at the Goddard Space Flight Center can be found at the following web site: http://epims.gsfc.nasa.gov/og-cgi/sectionb/sectionb html.sh.

Sterilization/Autoclaving: These Dual Lock products have not been tested for performance after sterilization or autoclaving processes. It is recommended that the customer evaluate the suitability of the Dual Lock product for these characteristics typical of what is expected for normal usage.

Washing and Dry Cleaning: The adhesive present on these Dual Lock products typically makes them unsuitable to washing or dry cleaning processes.

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Available Sizes[a]

Standard Widths in. ± 1/16" (mm) ± 1.6	**Roll Length** Yards (Meters)	Dual Lock SJ3540	Dual Lock SJ3540V[b]	Dual Lock SJ3541	Dual Lock SJ3541V[b]	Dual Lock SJ3542	Dual Lock SJ3542V[b]
1/2" (12.7 mm)	50 yds. (45.7 meters)	X[c]		X		X	
3/4" (19 mm)	50 yds. (45.7 meters)	X[c]		X		X	
1" (25.4 mm)	25 yds. (22.9 meters)					X	
1" (25.4 mm)	50 yds. (45.7 meters)	X	X	X	X	X	X
1 1/2" (38.1 mm)	50 yds. (45.7 meters)	X			X	X	
2" (50.8 mm)	50 yds. (45.7 meters)	X		X	X	X	X
3" (76.2 mm)	50 yds. (45.7 meters)				X		
4" (101.6 mm)	50 yds. (45.7 meters)	X			X	X	
Fabricated Forms Available[d]		1" x 1/2" 1" x 1" 1" x 1 1/4" 1" x 2" 1" x 3"		1" x 2"		2" x 2" 2" x 2 3/4"	
					Premated Dual Lock SJ3541/SJ3542		
					1" x 3" 1" x 6"		

a) All of the 3M™ Dual Lock™ Reclosable Fastener SJ3540, SJ3541 and SJ3542 products are available on 3" core. All of these products are supplied with the liner to the edge of the adhesive. There are no extended liners or selvedge edge with any of the standard products listed above. Contact your 3M authorized distributor or 3M representative for details on supplying special sizes or configurations.

b) 3M™ Dual Lock™ Reclosable Fastener SJ3540V, SJ3541V and SJ3542V are special versions of their respective fastener that have been cleaned to remove particulate matter making them more suitable for applications with-in clean rooms.

c) It is not recommended to engage Type 250 to Type 250 (Dual Lock SJ3540 to SJ3540) for widths of 0.75" or narrower. If these narrow widths are required, then it is suggested that a Type 170 to a Type 400 (Dual Lock SJ3542 to SJ3541) be evaluated.

d) Reclosable Fasteners can be fabricated in many other custom shapes and sizes to fit your product design and manufacturing process. Contact your local 3M authorized converter or 3M representative for additional options, configurations and ordering information.

Attachment Techniques

The following information is intended to assist the designer considering the use of 3M™ Dual Lock™ Reclosable Fasteners. Final product performance depends on actual conditions, including the fastener selected, the conditions in which the fastener is applied, 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 required 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 and desired end use.

As a general rule, four square inches of fastener area per pound 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.

There are typically six different methods for attaching Dual Lock to various surfaces. For complete details on techniques and options for attaching Dual Lock or Scotchmate, please see the techincal bulletin on Attaching Scotchmate and Dual Lock (70-0709-3929-6). The most important technique for attaching Dual Lock SJ3540, SJ3541 and SJ3542 to various substrates is pressure sensitive adhesive attachment.

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Attachment Techniques ***(continued)***

Pressure Sensitive Adhesive attachment: The fasteners and substrate surfaces should have equilibrated for a minimum of 1 hour at temperatures of 68°F (20°C) or greater before application. Generally these adhesive backed fasteners should be applied to surfaces that are smooth, dry and free of oils, mold release agents or other surface contaminants.

The substrate surface should be cleaned to remove any surface contaminants with an appropriate cleaning method for the customer's substrate, type and quantity of surface contaminants that need to be removed. **Note:** Be sure to follow all government regulations and the manufacturer's precautions and directions for use when using solvents or other cleaning methods.

After the substrate has been cleaned and dried, the liner is removed from the fastener's adhesive and without touching the adhesive, the fastener's adhesive is applied to the surface using light finger pressure. The fastener can then be rolled down, to increase contact of the adhesive with the substrate's surface, by one of two methods. Extra care must be exercised when rolling down 3M™ Dual Lock™ Reclosable Fasteners to prevent bending of the stems which can compromise the closure strength. The following methods allow adequate pressure to be applied to the Dual Lock without damaging the stems.

The first method uses a hand roller, with the roller wheel covered with a Type 170 Dual Lock reclosable fastener such as 3M™ Dual Lock™ Reclosable Fastener SJ3542. The Dual Lock covered roller is rolled over the Dual Lock applied to the substrate, engaging and disengaging the two Dual Lock pieces while being rolled down.

The second method consists of engaging a strip of plainback Dual Lock Type 170, such as 3M™ Dual Lock™ Reclosable Fasteners SJ3442 or SJ3742 to the previously attached adhesive backed Dual Lock. The backside of the plainback material can now be rolled down using a rubber roller, with no Dual Lock on the roller. This will fully engage the Dual Lock. After rolling down three times in each direction, the strip of plainback Dual Lock can be removed and used to roll down the next piece of Dual Lock in a similar manner.

The pressure-sensitive adhesive bonds to the substrate on contact and parts can be handled immediately. Adhesive bond strength increases with time, pressure and temperature. A minimum of one hour dwell is recommended before applying a load or disengaging assembled parts. Recommended time to achieve maximum bond strength is 24 hours.

Application Ideas

3M™ Dual Lock™ Reclosable Fasteners SJ3540, SJ3541 and SJ3542 can replace conventional mechanical fasteners in a wide range of assembly and attachment applications where reclosability is desired. They 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	
Paper	Cardboard	Acrylic	Rigid Vinyl
Glass	Sealed Wood	Polycarbonate	Polystyrene
Fabrics	Bare and Painted Metal	Polyethylene	Polypropylene
Powder Coated Paints			

Dual Lock SJ3540, SJ3541 and SJ3542 have shown to be useful for:

Access panels on exercise equipment	Attaching accessories to computer monitors
Interior signage	Decorative trim attachment
Kick plates on office partitions	Window valences

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For Additional Information

To request additional product information or to arrange for sales assistance, call toll free 1-800-362-3550 or visit www.3M.com/adhesives. Address correspondence to: 3M Industrial Adhesives and Tapes 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: 1-787-750-3000. In Mexico, phone: 52-70-04-00.

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ISO 9002 QS 9000

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