Dual Lock™ Reclosable Fasteners

SJ3560 (Type 250)*
SJ3561 (Type 400)
SJ3562 (Type 170)

Technical Data **December, 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 polyolefin strips 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.

The clear acrylic adhesive combined with the clear backing allows for the substrate color to show through the fastener. The acrylic adhesive is well suited for applications exposed to high temperatures, humidity or for high surface energy materials.

This product construction is especially suited for outdoor applications, where elevated temperatures are experienced or the potential for direct exposure to sunlight or ultra-violet light may occur. 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 SJ3562 (Type 170)	Dual Lock SJ3560 (Type 250)	Dual Lock SJ3561 (Type 400)
Material of Construction			
Stem/Heads	Clear Polypropylene	Clear Polypropylene	Clear Polypropylene
Backing	Clear Polypropylene	Clear Polypropylene	Clear Polypropylene
Adhesive	Clear Acrylic Foam Tape	Clear Acrylic Foam Tape	Clear Acrylic Foam Tape
Standard Color	Clear	Clear	Clear
Thickness[a] unmated ± 15%	0.14" (3.5 mm)	0.14" (3.5 mm)	0.14" (3.5 mm)
Selvedge Edges	None	None	None
Weight[a]	0.035 oz/in^2 (0.156 g/cm^2)	0.037 oz/in^2 (0.161 g/cm^2)	0.040 oz/in^2 (0.177 g/cm^2)
Liner	Clear 4 mil (0.10 mm) thick silicone treated polyolefin liner printed with 3M Dual Lock in red.		

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 SJ3562 (Type 170) engaged to 3M™ Dual Lock™ Reclosable Fastener SJ3560 (Type 250)	**3M™ Dual Lock™ Reclosable Fastener SJ3560 (Type 250) engaged to 3M™ Dual Lock™ Reclosable Fastener SJ3561 (Type 400)**	**3M™ Scotchmate™ SJ3571 (loop) engaged to 3M™ Dual Lock™ Reclosable Fastener SJ3560 (Type 250)[b]**
TENSILE (Rigid to Rigid Substrates)	lbs_F/sq inch (kNewtons/m^2) @ 72°F/50% RH		
Dynamic Tensile Engagement Strength	10 (69)	60 (414)	<1 (<6.9)
Dynamic Tensile Disengagement[c]	23 (159)	107 (738)	29 (200)
Static Tensile Holding Power	Holds minimum 2.2 #/in^2 (155 grams/cm^2) for indicated time and temperature		
100°F/100% RH	10,000 minutes	10,000 minutes	10,000 minutes
200°F	10,000 minutes	10,000 minutes	10,000 minutes
220°F	10,000 minutes	10,000 minutes	10,000 minutes
250°F	3 minutes	3 minutes	300 minutes
SHEAR (Rigid to Rigid Substrates)	lbs_F/sq inch (kNewtons/m^2)		
Dynamic Shear (1" x 1" overlap)[c]	11 (76)	70 (483)	112 (772)
Static Shear Holding Power	Holds minimum 2.2 #/in^2 (155 grams/cm^2) for indicated time and temperature		
100°F/100% RH	7,200 minutes	10,000 minutes	10,000 minutes
200°F	20,000 minutes	20,000 minutes	20,000 minutes
220°F	20,000 minutes	20,000 minutes	20,000 minutes
250°F	3,500 minutes	3,500 minutes	3,500 minutes
PEEL AND CLEAVAGE[c]	Pounds/inch width (grams/cm width)		
Cleavage Strength (Rigid to Rigid)	8.3 (1485)	28.5 (5099)	12.4 (2218)
Peel Strength (“T” Peel, Flexible to Flexible)	0.5 (89)	1.7 (304)	2.7 (483)
Peel Strength (90° Peel, Flexible to Rigid)	1.6 (286)	5.4 (984)	4.1 (733)
ENGAGED THICKNESS[d]	Inches (mm) ± Tolerance		
(Nominal without liner)	0.21 (5.4) ± 15%	0.23 (5.9) ± 15%	0.20 (5.0)
CLOSURE CYCLE LIFE[e]	1,000	1,000	50
SHELF LIFE[f]	24 months	24 months	24 months

Note: Long Term Static Load: Conditions such as temperature variations, engagement area, closure pressure and vibrations or side to side movement after engagement or prolonged periods of exposure to environmental factors can affect the closure strength and long term static load performance. 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 are in approximately the following increasing order of strength: Dual Lock SJ3562 engaged to Dual Lock SJ3560 < (less than) Dual Lock SJ3561 engaged to Dual Lock SJ3562 ≈ (approximately equal to) Dual Lock SJ3560 engaged to Dual Lock SJ3560 < Dual Lock SJ3560 engaged to Dual Lock SJ3561. The combinations of Dual Lock SJ3561 engaged to Dual Lock SJ3561 and Dual Lock SJ3562 engaged to Dual Lock SJ3562 are not recommended.

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 SJ3560, SJ3561, SJ3562 and Scotchmate SJ3571 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 SJ3560, SJ3561 and SJ3562 resists attack by many common laboratory solvents and transportation fluids (gasoline, motor oil, etc.). When these products were subjected to a splash test (20 second submersion, followed by a 20 second air dry for three times) there was no visible degradation when tested with gasoline, JP-4 jet fuel, mineral spirits, motor oil, ammonia cleaner, acetone or methyl ethyl ketone. Additional tests should be conducted by the user to evaluate their solvents and exposure time expected for the actual application.

Plasticizer Resistance: The adhesive on Dual Lock SJ3560, SJ3561 and SJ3562 has reasonable resistance to plasticizers found in many common flexible vinyls or other materials containing high levels of plasticizing materials. A plasticizer resistance test consists of applying the fastener via it's adhesive to a plasticized vinyl and subjecting the combination to 158°F (70°C) for 1 week with no applied load. After this time period there was no adhesive oozing occurring and peel tests typically show good adhesion to the substrate. Additional tests should be conducted by the user though to evaluate the plasticizer resistance for the chosen application, substrates, environmental exposure and duration expected in the actual application. Other products to evaluate for plasticizer resistance are 3M™ Dual Lock™ Reclosable Fastener SJ3550CF and 3M™ Scotchmate™ Reclosable Fasteners SJ3522 and SJ3523.

Flammability Resistance: If you need 3M Reclosable Fasteners that pass many of the standard flammability tests (such as FAR 25.853, ASTM E-162, ASTM E-662, BSS-7239 and others), it is suggested that you refer to the Flame Resistant Fasteners data page (70-0707-3992-8).

Environmental Effects: Temperatures down to -20°F (-29°C) increases the typical closure strengths. These products perform well under long term exposure to sunlight or ultraviolet radiation. These products have been subjected to 1,000 hours under a Xenon arc weatherometer (ASTM D2565) without adverse affects. 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 excellent 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 have low volatile outgassing values. 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

Standard Widths[a] in. ± 1/16" (mm) ± 1.6	Roll Length Yards (Meters)	Dual Lock SJ3560 (Type 250)	Dual Lock SJ3561 (Type 400)	Dual Lock SJ3562 (Type 170)
1/2" (12.7 mm)	50 yds. (45.7 meters)	X[b]		X
3/4" (19 mm)	50 yds. (45.7 meters)	X[b]		
1" (25.4 mm)	50 yds. (45.7 meters)	X	X	X
1 1/2" (38.1 mm)	50 yds. (45.7 meters)	X		
2" (50.8 mm)	50 yds. (45.7 meters)	X		
3" (76.2 mm)	50 yds. (45.7 meters)	X		
4" (101.6 mm)	50 yds. (45.7 meters)	X	X	
6" (152.4 mm)	50 yds. (45.7 meters)	X		
Fabricated Forms[c]		1" x 1/2" 1" x 1" 1" x 1" (premated) 1" x 1 1/2" (premated) 1" x 2" 1" x 3"		

a) All of the 3M™ Dual Lock™ Reclosable Fastener SJ3560, SJ3561 and SJ3562 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) It is not recommended to engage Type 250 to Type 250 (Dual Lock SJ3560 to SJ3560) for widths of 0.75" or narrower. If these narrow widths are required, it is suggested that any of the following combinations be evaluated: Dual Lock SJ3560 engaged to Dual Lock SJ3561, Dual Lock SJ3560 engaged to SJ3562 or Dual Lock SJ3561 engaged to Dual Lock SJ3562.

c) Reclosable Fasteners can be fabricated in many 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 SJ3560, SJ3561 and SJ3562 to various substrates is pressure sensitive adhesive attachment.

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.

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Attachment Techniques *(continued)*

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 is 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 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, three times in each direction, over the Dual Lock attached to the substrate.

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. A rubber roller, with no Dual Lock on the roller is rolled over the backside of the plainback material. This will engage the two Dual Lock pieces. 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 twenty four hours dwell time is recommended before applying a load or disengaging assembled parts. Recommended time to achieve maximum bond strength is 72 hours.

Application Ideas

3M™ Dual Lock™ Reclosable Fasteners SJ3560, SJ3561 and SJ3562 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.

Metals

Aluminum Steel

Not suitable for powder coated paints

Plastics

Acrylic Rigid Vinyl
Polycarbonate Polystyrene

Not suitable for low surface energy plastics Such as polyethylene or polypropylene

Miscellaneous Materials

Glass Sealed Wood
Gel Coat Finishes

Dual Lock SJ3560, SJ3561 and SJ3562 have shown to be useful for:

Attaching toll tag monitors
Seat cushions in marine applications
Removable medical equipment
Equipment access doors
Vibration and sound dampening control
Attachment of computer accessories

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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.

Certification/ Recognition

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.

Important Notice

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