

3M

Dual Lock™ Reclosable Fasteners

SJ3788 (Type 400)

Black Dual Lock with gray conformable acrylic adhesive

Product Information

September, 2007

Product Description

3M™ Dual Lock™ Reclosable Fasteners are comprised of a continuous thick film backing with stems protruding from one side of the backing. The self supporting flexible stems have mushroom shaped heads. The base film, the stems and mushroom heads are manufactured from black polyolefin materials. SJ3788 which is a 3M™ Dual Lock™ Reclosable Fastener Type 400 with a thick gray conformable adhesive.

The Type 400 refers to the approximate number of stems per square inch currently available for this product. Thick conformable gray acrylic adhesive allows for applications requiring joining two pieces with large gaps between the surfaces. The adhesive on this product is protected with a red non-silicone treated polyolefin liner with no printing. The liner permits easy die-cutting and eliminates any chance for silicone contamination from silicone treated liners. The gray acrylic adhesive is well suited for applications exposed to high temperatures and humidity. The conformable adhesive has slightly better adhesion to slightly irregular or textured surfaces than many of our other adhesives on Dual Lock reclosable fasteners. A slightly thinner white conformable adhesive is available on 3M™ Dual Lock™ Reclosable Fastener SJ3777, whereas a thicker white conformable adhesive is available on 3M™ Dual Lock™ Reclosable Fastener SJ3758.

For optimum performance, this Dual Lock reclosable fastener can be engaged in the following combinations of increasing strength: Dual Lock reclosable fasteners type 170 to type 400 and type 250 to type 400. Currently only the type 400 is a standard item with this adhesive. Dual Lock reclosable fasteners can also engage with many loop materials, such as 3M™ Scotchmate™ Reclosable Fasteners Loop. This combination allows a quick grab closure with high strength, but reduced cycle life. See the technical bulletin, *3M™ Dual Lock™ and 3M™ Scotchmate™ Reclosable Fastener Combinations* (70-0709-3929-6) for additional information.

When two pieces of Dual Lock reclosable fasteners are pressed together, the stems flex and the mushroom heads slide past each other. After passing the mushroom heads on the opposing mating piece, the stems snap back into their original position, interlocking with the mushroom heads on the opposing piece. The audible SNAP indicates engagement has occurred. This provides a strong reclosable attachment system. These Dual Lock reclosable fasteners can provide high tensile strength but the Dual Lock reclosable fasteners can easily be opened by simply cleaving or peeling open the closure.

Dual Lock reclosable fasteners can reduce the number of, or replace, conventional fasteners such as screws, clips, rivets, snaps and bolts in many applications. This product construction is especially suited for outdoor applications, where elevated temperatures, the potential for direct exposure to sunlight or ultra-violet light may occur, presence of high moisture levels may occur.



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Product Construction

Note: The following information is not product release requirements, nor product specifications. Rather this data represents typical performance using standard test methods. This is intended for use as a guide to assist in selection of 3M™ Dual Lock™ Reclosable Fasteners for further evaluation. Customer specifications should not be based solely on the data presented in this document. It is recommended that the customer test the product under expected use conditions in the desired application to determine actual suitability and performance.

Fastener Product	3M™ Dual Lock™ Reclosable Fastener SJ3788 (Type 400)
Type: Approx. Stems/In ² (Stems/cm ²)	400 (62)
Material of Construction	
Stems/Heads	Black Polyolefin
Backing	Black Polyolefin
Adhesive	Gray Acrylic Adhesive
Liner	Red 4.5 mil (0.11 mm) thick non printed polyolefin liner with no silicone release coating.
Standard Color	Black
Thickness^(a) Unmated ± 15%	0.16" (4.1 mm)
Selvage Edges	None
Weight^(a)	0.043 oz/in ² (0.190 g/cm ²)
Maximum Curvature	0.072" per lineal inch
Shelf Life	24 months from date of manufacture when stored in original packaging between 60° to 80°F (16° to 27°C) and 40 to 60% relative humidity.

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

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Typical System Performance Characteristics

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Unless stated differently, typical system performance characteristics were measured under controlled laboratory conditions of 72°F (22°C) and 50% relative humidity when attached to 1/8" thick non-anodized aluminum panels. It is recommended that the customer test the product under expected use conditions in the desired application to determine actual suitability and performance.

Typical System Performance ^(a,b)			
	3M™ Dual Lock™ Reclosable Fastener SJ3752 (Type 170) engaged to 3M™ Dual Lock™ Reclosable Fastener SJ3788 (Type 400)	3M™ Dual Lock™ Reclosable Fastener SJ3781 (Type 250) engaged to 3M™ Dual Lock™ Reclosable Fastener SJ3788 (Type 400)	3M™ Dual Lock™ Reclosable Fastener SJ3788 (Type 400) engaged to 3M™ Scotchmate™ Reclosable Fastener Loop SJ3571
INITIAL TENSILE (Rigid to Rigid Substrates)	Pounds_F/sq inch (Newtons/cm²) @ 72°F (22°C)/50% RH		
Dynamic Tensile Engagement Force	15 (10)	36 (25)	<1.0 (<0.7)
Dynamic Tensile Disengagement Force	37 (26)	77 (53)	23 (16)
Static Tensile Holding Strength	Minutes holding 2.2 #/in² (155 gms/cm²) for indicated time and temp.		
100°F/100% RH	10,000	10,000	10,000
158°F	10,000	10,000	10,000
200°F	10,000	10,000	10,000
220°F	10,000	10,000	10,000
INITIAL SHEAR (Rigid to Rigid Substrates)	Pounds_F/sq inch (Newtons/cm²)		
Dynamic Shear (1" x 1" overlap)	31 (32)	105 (72)	103 (71)
Static Shear Holding Strength	Minutes holding 2.2 #/in² (155 gms/cm²) for indicated time and temp.		
100°F/100% RH	9,500	10,000	9,000
158°F	10,000	10,000	10,000
200°F	9,000	9,000	8,000
220°F	200	100	100
INITIAL DYNAMIC PEEL AND CLEAVAGE	Pounds_F/inch width (Kilograms_F/cm width)		
Cleavage Strength (Rigid to rigid)	23 (4.1)	29 (5.2)	28 (5.0)
"T" Peel Force (Flexible to flexible): Peel Initiation	5 (0.9)	7.5 (1.3)	4.4 (0.8)
"T" Peel Force (Flexible to flexible): Continue Peel	1.9 (0.3)	2.7 (0.5)	1.4 (0.3)
90° Peel Force (Flexible to rigid): Peel Initiation	12 (2.1)	16 (2.9)	4 (0.7)
90° Peel Force (Flexible to rigid): Continue Peel	4.5 (0.8)	6.6 (1.2)	1.6 (0.3)
ENGAGED THICKNESS^(c)			
Nominal: inches (mm)	0.25 (6.3)	0.25 (6.3)	0.22 (5.7)
CLOSURE CYCLE LIFE^(d)	1,000	1,000	50

Note: Long Term Static Load: Conditions such as engagement area, supported weight, forces on the closure, vibrations or side to side movement, as well as prolonged periods of exposure to environmental factors such as temperature, ultraviolet light or humidity plus other factors beyond the control of 3M can affect the closure strength and long term performance. Dual Lock reclosable fasteners may slip or creep in the direction of the applied forces when subjected to loads at temperatures, times, force or weights greater than indicated. The user is responsible for designing the amount of fastening area based upon the expected use conditions for the intended application. Four square inches of fastening area per pound (57.3 sq. cm/kilogram) of static load is suggested as a starting point for such evaluations.

- Dual Lock reclosable fastener was engaged to Dual Lock reclosable fastener or 3M™ Scotchmate™ Reclosable Fastener Loop SJ3571 with firm pressure and disengaged at the rate of 12 inches (305 mm) per minute.
- Scotchmate reclosable fastener loop engaged to Dual Lock reclosable fastener may provide increased closure strength over Dual Lock reclosable fastener to Dual Lock reclosable fastener combinations. Due to this increased strength, extra care should be given to ensure the maximum bond strength is obtained to the adherends being joined. Failure to obtain bond strengths to the adherend that are sufficiently high may cause the Dual Lock reclosable fastener to release from the adherend upon disengagement.
- Engaged thickness is measured with a 1/2" diameter pressure foot with a 34 gram weight and will decrease if a load is applied or increase if a separation (tensile) force is applied.
- Cycle Life is the number of cycles (openings and closings) that the Dual Lock reclosable fastener is subjected to while maintaining 50% or greater of the original peel value.

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Additional Performance Characteristics

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Resistance to Chemicals: The polyolefin components and the acrylic adhesive on these products have not been tested but should resist contact with most common solvents, acid and alkaline solutions when exposed for short time periods.

Resistance to Environmental Exposure: Temperatures down to -40°F (-40°C) increases the typical closure strengths. System static shear is reduced at temperatures above 158°F (70°C) and significantly above 200°F (93°C). These products perform well under long term exposure to sunlight or ultraviolet radiation. Specific testing under the expected environmental conditions is recommended.

Resistance to Water or Humidity Exposure: Closure strength should not be affected after prolonged exposure to water or humidity. Once bonded to the adherend, the adhesive has excellent resistance to moisture on most surfaces under typical use conditions. Exposure to elevated heat and chlorine or bromine may compromise the adhesive performance to the 3M™ Dual Lock™ Reclosable Fasteners.

Volatile Outgassing: Volatile outgassing, per ASTM E595, is one important test in determining the suitability of materials for spacecraft. 3M™ Dual Lock™ Reclosable Fastener SJ3788 has 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/>.

Washing and Dry Cleaning: The thick adhesive present on these Dual Lock reclosable fastener products typically makes them unsuitable for washing and dry cleaning processes. The adhesive may soften, leaving adhesive residue on other materials during the cleaning process. If Dual Lock reclosable fastener is cleaned or washed, care must be exercised to avoid the mushroom stems from becoming entangled with loop materials and fabrics that may be present.

These Dual Lock reclosable fastener products have not been tested for appearance or performance after exposure to the following conditions:

- **Gas or steam sterilization or autoclaving processes.**
- **Resistance to plasticizers or low molecular weight additives.**
- **Common fungus growth tests (ASTM G21 or MIL Std 810F Method 508.5).**
- **Static discharge during application, use or removal.**
- **Flammability Resistance** to common flammability tests such as FMVSS-302, FAR 25.853, FAR 25.856, ASTM E162, ASTM E662 or UL94.

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Available Sizes	Standard Widths ^(a) in. ± 1/16" (mm) ± 1.6	Roll Length Yards (Meters)	3M™ Dual Lock™ Reclosable Fastener SJ3788 (Type 400)
	1" (25.4 mm)	50 (45.7)	✓
	2" (50.8 mm)	50 (45.7)	✓
	3" (76.2 mm)	50 (45.7)	✓
	6" (152.4 mm)	50 (45.7)	✓
	Fabricated Forms^(b)		Cut Pieces

- a) 3M™ Dual Lock™ Reclosable Fastener SJ3788 products are available on 3" ID fiber core. All of these products are supplied with the liner to the edge of the adhesive. There are no extended liners or selvage 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 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.

Design Considerations The following information is intended to assist the designer considering the use of 3M™ Dual Lock™ Reclosable Fasteners with a pre-applied pressure sensitive adhesive. Product performance depends upon a number of factors, including the Dual Lock reclosable fastener selected, the conditions in which the Dual Lock reclosable fastener is applied, the time and environment 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 3M products to determine whether it is fit for a particular purpose and suitable for the user’s substrates, method of application and desired end use.

Many factors can affect the application, engagement and use of Dual Lock reclosable fasteners. Before trying to apply, engage, or use the Dual Lock reclosable fasteners, the customer should consult the technical bulletin, *3M™ Dual Lock™ Reclosable Fasteners – Roll Goods Design Criteria* (70-0709-4009-6).

Surface Preparation The amount and type of surface preparation required will depend upon the surfaces to which Dual Lock reclosable fastener SJ3788 is attached and the expected product use exposure conditions. Refer to the technical bulletin below for surface preparation requirements when using pressure sensitive adhesives.

Attachment Techniques The most common technique for attaching Dual Lock reclosable fastener SJ3788 is direct attachment using its pre-applied pressure sensitive adhesive. Complete details to consider before attaching these products using this method are found in the technical bulletin, *3M™ Dual Lock™ Reclosable Fasteners – Attachment using Pressure Sensitive Adhesives or Heat Bonding* (70-0709-4006-2). Heat bonding is not suggested as a method of attachment for this adhesive system.

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Application Ideas

3M™ Dual Lock™ Reclosable Fastener SJ3788 can replace conventional mechanical fasteners in a wide range of assembly and attachment applications where reclosability is desired. This provides a conformable adhesive for joining two materials with slightly irregular or textured surfaces. Dual Lock reclosable fastener SJ3788 bonds 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 Coated Finishes

Dual Lock reclosable fastener SJ3788 can be evaluated in some of the following applications:

Removable equipment
Equipment access doors

Vibration and sound dampening control
Attachment of computer accessories

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Certification/ Recognition

MSDS: 3M has not prepared an 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 or 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 or 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.

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.

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ISO 9001:2000 - ISO/TS 16949:2002

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Printed in U.S.A.
©3M 2007 78-9236-4023-7 (9/07)