



Dual Lock™ Reclosable Fasteners

Attachment using Liquid and Hot Melt Adhesives

Introduction

3M™ Dual Lock™ Reclosable Fasteners are comprised of 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 polyolefin materials. Three types of Dual Lock reclosable fasteners (type 170, type 250 and type 400). The type refers to the approximate number of stems per square inch. A product constructed with similar materials and configuration but much thinner is 3M™ Dual Lock™ Low Profile Reclosable Fastener which has approximately 705 stems per square inch.

Dual Lock reclosable fasteners can be engaged in the following combinations of increasing strength: type 170 to type 250, type 170 to type 400, type 250 to type 250 and type 250 to type 400. Dual Lock reclosable fasteners and Dual Lock low profile reclosable fasteners can also engage with many loop materials such as 3M™ Scotchmate™ Reclosable Fastener Loop. This combination allows a quick grab closure with high strength, but reduced cycle life. We do not recommend that standard height Dual Lock reclosable fasteners be engaged with Dual Lock low profile reclosable fasteners as performance characteristics have not been well studied.

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 is well suited to many applications where a high strength, reclosable fastening system is required. Many Dual Lock reclosable fastener products have good performance even after exposure to ultraviolet radiation, high moisture levels and wide temperature ranges up to approximately 220°F (105°C). Refer to specific technical data pages for product performance under various temperature, weight and loading conditions.

Dual Lock reclosable fasteners have many options for attaching to various surfaces and materials. The table below summarizes the backing options available and method commonly used for attachment. Details on procedures for attaching Dual Lock reclosable fasteners using various methods suitable for the different backing types are summarized on respective technical bulletins. Attachment methods with the same color are on the same technical bulletins.

Roll good backing type					
Backing Type	Pressure Sensitive Adhesives		Non-woven	None (Plainback)	Ultrasonic* (Semi-rigid)
	Acrylic adhesive	Rubber adhesive			
Attachment Method Technical Bulletin					
Pressure Sensitive Adhesive	✓	✓			
Heat Bonding		✓			
Liquid Adhesives			✓		
Hot Melt			✓		
Sewing				✓	✓
Mechanical			✓	✓	✓
Ultrasonic*					✓

*To polypropylene and similar materials.

Important Notice:

All physical properties, statements, and suggested procedures are based on tests 3M believes to be reliable or our product experience. There are many 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 chosen 3M product(s) to determine whether it is fit for a particular purpose and suitable for the user's method of application.

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Design Considerations when using 3M™ Dual Lock™ Reclosable Fasteners Many factors can affect the application, engagement and use of 3M™ Dual Lock™ Reclosable Fasteners. Before applying, engaging, or using 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 attachment method used to attach the Dual Lock reclosable fasteners and the surfaces to which they will be attached. Refer to manufacturers directions for the specific liquid or hot melt adhesive discussed below for recommended surface preparation methods.

Attachment Methods **Using Liquid and Hot Melt Adhesives** For the purpose of this technical bulletin, liquid or hot melt adhesives consist of any adhesive that is liquid at some time during its application, but cures or sets up forming a strong bond between the Dual Lock reclosable fastener and the substrate surface. These types of adhesives can include, but are not limited to, standard hot melt adhesives, epoxy, curable polyurethane or other types of adhesives. Techniques for attaching Dual Lock reclosable fasteners are summarized below. Some of these methods may be amenable to automated application and attachment techniques. Contact your 3M Sales Representative to discuss automated equipment options or to assist in determining which Dual Lock reclosable fastener would best be suited for your particular material and expected use conditions.

3M™ Dual Lock™ Reclosable Fasteners (SJ3444, SJ3754, SJ3223, SJ3753, SJ3254, SJ3253 or SJ3543) have a unique white, non-woven polypropylene material bonded to the backside of the Dual Lock reclosable fasteners. This allows the Dual Lock reclosable fastener to be attached to a variety of materials and surfaces using liquid or hot melt adhesives. These Dual Lock reclosable fasteners can easily be bonded to wood, foams, fabric and similar materials using a variety of 3M adhesives. **Note:** Because of the thicker backing, this product is NOT recommended for sewing. 3M™ Dual Lock™ Reclosable Fastener SJ3481 which has a thicker backing along with many of Dual Lock reclosable fastener piece parts is recommended for attachment using mechanical Dual Lock reclosable fasteners. The use of hot melt or liquid adhesives is not recommended for attaching Dual Lock reclosable fastener products with pre-applied adhesives, plain back or rigid back Dual Lock reclosable fasteners as insufficient bonding strength may be obtained.

Hot Melt Adhesives:

Following are examples of 3M™ Scotch-Weld™ Adhesives that have successfully been used to bond these non-woven backed Dual Lock reclosable fastener products. Choice of a hot melt adhesive and exact method for using will depend upon the material being adhered to, the expected environmental and use conditions and other factors known to the customer. It is recommended the customer evaluate hot melt adhesives and exact application conditions for their application.

3M™ Scotch-Weld™ Adhesive 3796 is liberally applied to the surface to which the Dual Lock reclosable fastener is to be attached. Press the non-woven side of the Dual Lock reclosable fastener into the adhesive. Gently twisting the Dual Lock reclosable fastener will allow the hot melt to further penetrate the non-woven backing. In some cases, the Dual Lock reclosable fastener may need to be secured until the hot melt cools. Securing may be accomplished using finger clamps or mechanical attachment. Some squeeze out of adhesive around edges is desirable for maximum bond strength. It may be necessary to mechanically fasten the ends for best results in some applications.

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Attachment Methods (continued)

One factor affecting the ultimate bond strength is dependent upon the amount of adhesive to surface contact and the ability for the adhesive to penetrate into the non-woven fabric while the viscosity is still low enough to allow sufficient wet-out. Firm application pressure provides increased contact of the adhesive with the surface and helps improve the bond strength. It is suggested to apply 5 to 15 pounds per square inch (50 to 150 kPa) of pressure. Extra care must be exercised when applying pressure to Dual Lock reclosable fasteners to prevent bending or crushing of the stems which can compromise the closure strength. Pressure is carefully applied by one of three methods discussed below which increases contact of the adhesive with the material's surface. These methods allow adequate pressure to be applied to 3M™ Dual Lock™ Reclosable Fastener while minimizing or eliminating stem damage.

- a) The first method uses a Dual Lock reclosable fastener Type 170 with a rubber based adhesive such as 3M™ Dual Lock™ Reclosable Fastener SJ3542 applied to a clamping surface comprised of a firm foam surface Dual Lock reclosable fastener. The clamp covered with Dual Lock reclosable fastener SJ3542 is engaged with the Dual Lock reclosable fastener being applied. The Dual Lock reclosable fastener will engage or disengage as the clamp is closed or opened, allowing pressure to be applied holding the Dual Lock reclosable fastener against the surface during the cure or cooling time. When using this method, it is important that the clamping surface is parallel to the surface with the Dual Lock reclosable fastener being applied.
- b) The second method consists of placing a strip of plain back Dual Lock reclosable fastener Type 170, such as 3M™ Dual Lock™ Reclosable Fasteners SJ3442 or SJ3742 to the previously adhered Dual Lock reclosable fastener. The clamping surface is comprised of a firm foam surface which is pressed against the Dual Lock reclosable fastener applied to the material. The Dual Lock reclosable fastener will engage or disengage as the clamp is closed or opened, allowing pressure to be applied holding the Dual Lock reclosable fastener flat against the surface during the cure or cooling time. After sufficient curing or cooling time, the clamp is opened and the strip of plain back Dual Lock reclosable fastener can be removed and used to hold the next piece of Dual Lock reclosable fastener in a similar manner. Alternatively, this strip or piece can be left in place during subsequent handling or shipping to prevent damage to the stems and mushroom heads. This strip can then be removed at the point of use.
- c) This option is similar to option b above, but the mating Dual Lock reclosable fastener piece will be used in the final application. If this method is used, care must be exercised in making sure the liner and adhesive or backing for plain back products on this second piece will not be damaged during the pressurization step.

Moisture Curing Polyurethane Adhesives:

3M™ Scotch-Weld™ Polyurethane Reactive Adhesive TE031 and TS230 (hot melt) have been used in some applications to adhere Dual Lock reclosable fasteners non-woven backed products to various fabrics. The hot melt is preferably applied to both surfaces. It may be advantageous to spread the adhesive creating a more uniform coating before attaching the Dual Lock reclosable fastener to the fabric. The Dual Lock reclosable fastener is held with slight pressure to the fabric, using one of the methods discussed above, while the adhesive cools.

Acrylic Adhesives:

3M™ Scotch-Weld™ Structural Acrylic Adhesive DP8005 and DP8010 are similar adhesives and may be evaluated for bonding these Dual Lock reclosable fastener products with non-woven backings to plastic, metal and some fabrics. Scotch-Weld structural acrylic adhesive DP8005 successfully bonded 3M non-woven backed Dual Lock reclosable fasteners to acrylic panels. The acrylic adhesive is applied, after proper mixing, to the back of the Dual Lock reclosable fastener and spread out creating a uniform coating. The Dual Lock reclosable fastener product is held in contact with the substrate using light pressure, using one of the methods discussed above, until the adhesive cures. Specific use conditions for the chosen acrylic adhesive should be consulted to ensure proper mixing ratios, application pressure and cure time.

It is important to evaluate the chosen adhesive under expected environmental and use conditions when bonded to Dual Lock reclosable fasteners.

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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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