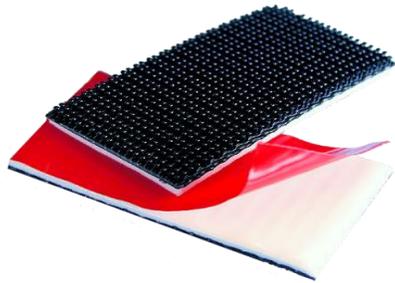


# 3M™ Dual Lock™ Reclosable Fasteners with Pressure Sensitive Adhesive

## Technical Data Sheet



### Product Description

3M Dual Lock Reclosable Fastening Systems are positive-locking, blind fasteners designed for attaching automotive trim components. The products feature mushroom-shaped polyolefin on a continuous polyolefin backing.

When pressed together these mushroom-shaped stems interlock to provide a strong reliable attachment or high tensile closure with an audible click. Dual Lock fasteners are used primarily to secure rigid and semi-rigid surfaces such as trim or door panels, instrument panel bezels, headliners, and other automotive interior trim.

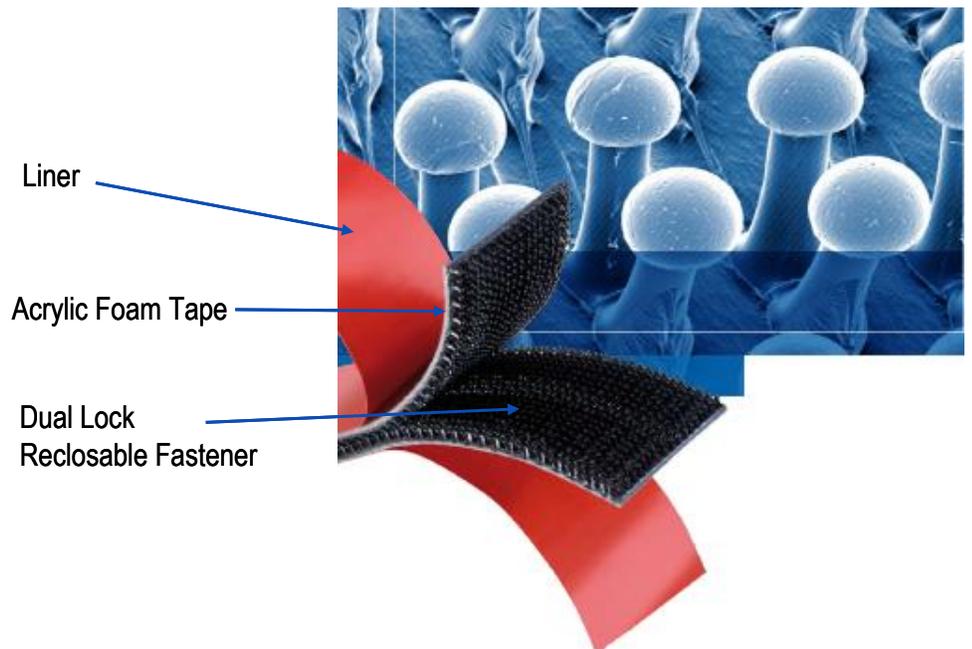
3M Dual Lock fasteners overcome the often-difficult alignment and installation problems of screws and hidden fastener. They offer simple installation with no additional tools required.

The fastener engaging area can be easily detached when repairs or maintenance are necessary, and engaged together later again.

3M Dual Lock with pressure sensitive adhesive combines the features of the Dual Lock fastener with 3M Automotive Acrylic Foam Tape for attachment to painted sheet metal and many other automotive substrates.

3M Dual Lock fasteners are also available in various pop-in designs, die-cut shapes and slide-in constructions.

### General Product Construction



## Features

<b>Easy Alignment</b>	3M Dual Lock fasteners engage in any orientation. The stems slide over each other until they are engaged with a firm pressure and an audible signal, eliminating concerns about misalignment or premature engagement.
<b>Reclosability</b>	3M Dual Lock fasteners can be opened and closed up to 1000 times, depending on the application.
<b>Vibration Resistance</b>	The visco-elastic property of the Acrylic Foam Tape and the special mushroom construction absorb vibration and rattling of components.
<b>Ease of Assembly</b>	3M Dual Lock fasteners do not require any special tools or equipment, fasteners can be attached to components before they enter the assembly plant, reducing the number of parts and the required assembly time.
<b>Blind Attachment</b>	3M Dual Lock fasteners can be attached on the rear side of the interior part where it won't interrupt the show surface.
<b>Multiple Attachment Methods</b>	Available in numerous forms, such as a variety of mechanical fastener backed options or pressure sensitive adhesive backed. This provides the ability to attach to a variety of surfaces, using different methods.
<b>Adjustable Engagement and Disengagement Forces</b>	Combinations of stem densities and the engaged area provide adjustable and proportional engagement and disengagement forces.
<b>Regulations</b>	The product can be found as material entry under <a href="http://www.mdssystem.com">www.mdssystem.com</a> . Please send inquiries for product IMDS ID numbers to: <a href="mailto:3M-IMDSrequest@mmm.com">3M-IMDSrequest@mmm.com</a>
<b>IMDS Number:</b>	<a href="http://www.mdssystem.com/imdsnt/startpage/index.jsp">www.mdssystem.com/imdsnt/startpage/index.jsp</a>

## 3M™ Dual Lock™ Types

Dual Lock Fasteners are available in three stem densities:



DL 400 (400 stems/inch<sup>2</sup> ; 62 Stems/cm<sup>2</sup>)



DL 250 (250 Stems/inch<sup>2</sup>; 39 Stems/cm<sup>2</sup>)



DL 170 (170 Stems/inch<sup>2</sup>; 26 Stems/cm<sup>2</sup>)



## Product Offering

Dual Lock Type* /Tape	Acrylic Foam Tape Thickness** (mm)	Single Dual Lock Thickness (not engaged)** (mm)	Single Thickness Tolerance (mm)	Adhesive System
Dual Lock plain	-	2,57	+/- 0,25	-
Dual Lock*/468MP	0,1	2,8	+/- 0,35	Acrylic
Dual Lock*/5428	0,4	3,1	+/- 0,5	AR-7
Dual Lock*/5580	0,8	3,5	+/- 0,5	AR-7
Dual Lock*/GT6008	0,8	3,5	+/- 0,5	Self-stick
Dual Lock*/5361	1,1	3,8	+/- 0,5	AR-7
Dual Lock*/PX5011	1,1	3,8	+/- 0,5	ZX
Dual Lock*/GT6012	1,2	3,9	+/- 0,5	Self-stick
Dual Lock*/5356	1,5	4,2	+/- 0,5	AR-7
Dual Lock*/5745	2,0	4,7	+/- 0,5	AR-7
Dual Lock*/4225	3,2	5,8	+/- 0,5	AR-5

**Liner Materials:**

-Polyethylene in red (only roll goods). 468MP is only available with paper liner.

-Paper liner (especially used for die cut parts) in brown, white and blue.

**Adhesive Systems:**

-AR-7 and AR-5 adhesive used for most substrates like painted panel, metal, etc.

-ZX special adhesive for low energy substrates (i.e. Polyolefin, PP, etc.)

\* DL Type either DL 170, 250 or DL 400.

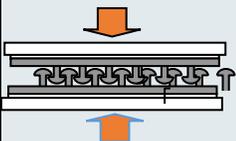
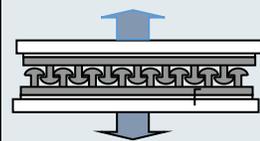
\*\* Thickness does not include liner

\*\*\* Average stem density



## 3M™ Dual Lock™ Combinations

The values listed in the table below are based on typical performance of Dual Lock reclosable fasteners with pressure sensitive adhesive securely attached to rigid surfaces. Engagement and disengagement performance are affected by the tape type and density as well as substrate hardness. In general, the more rigid the attachment system chosen, the higher the disengagement performance strength.

Typical Engagement / Disengagement Force		3M Dual Lock Combinations			
Initial Engagement*		170 / 400	250 / 250 Down web	250 / 250 Cross web	250 / 400
	[N/cm <sup>2</sup> ]	12-17	12-18	9-17	21-32
Initial Disengagement*		170 / 400	250 / 250	250 / 250	250 / 400
	[N/cm <sup>2</sup> ]	27-41	26-39	19-38	39-56
		The combinations DL170 / DL170 and DL400 / DL400 are not recommended. The combination DL170/DL170 is too weak and DL400/400 can be considered permanent fixation, depending on the area, and should be used only after thorough customer testing.			

\*Tests according to 3M™ TMG5727 with 300mm/min crosshead speed and run at 23°C and 50% R.H.

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

## Maximum Suggested Static Loading

Laboratory testing indicates that 1 square inch (6.45 cm<sup>2</sup>) piece of 3M™ Dual Lock Reclosable Fastener bonded to a high surface energy substrate will hold a maximum static load of 1 kg at 100°C for 10,000 minutes.

Note that these tests were performed with only one force interacting on the sample. These tests do not take into consideration the real-world conditions often encountered during normal vehicle operation over the life of a vehicle.

Factors that should be considered for real world use are:

- Additional stresses/forces induced under normal driving conditions (i.e. vibration, humidity, etc.),
- Uneven gapping caused by variations in the application and the assembly of the vehicle or application design,
- Extended temperature and humidity cycling over the life of the vehicle,
- Misalignment of the Dual Lock mating parts resulting in less engagement area, and
- A warped mounting surface causing less surface contact with Dual Lock adhesive.

The nature of the acrylic foam tapes used on Dual Lock Reclosable Fasteners should be considered. 3M Pressure Sensitive Adhesive (PSA) Acrylic Foam Tapes are viscoelastic by nature, and their strength and stiffness are a function of the rate at which they are stressed and the thickness.

3M suggests that the maximum loading of a 1 square inch piece (6.45 cm<sup>2</sup>) of Dual Lock Reclosable Fastener with PSA backing should be:

Static Force	Example	Suggested Static Loading (per 6.45 cm <sup>2</sup> or 1 in <sup>2</sup> )
Tensile		500 g
Shear		333 g
Cleavage		250 g
<p>Note: These suggestions should be considered as a starting point for a design and are influenced by tape thickness and area. It is important to design in additional safety factors for real world conditions.</p>		

## Product Construction

*Material (Dual Lock)* Polyolefine

*Color (Dual Lock)* Black

*Environmental Stability* Excellent moisture resistance (Specifically for Dual Lock).

Minimum 90°C constant temperature, depending on load. (See max. temperature for tape)

For higher temperature requirements (up to +120°C) it is recommended to use of Dual Lock plain back in combination with a hot melt or reactive melt.

The engagement and disengagement forces are affected by temperature. Lower operating temperatures show higher level of forces; higher operating temperatures result in lower level of forces. Please make sure the designed Dual Lock area is appropriate for the application temperature range.

*Shelf Life* 12 months after receiving at customer site when stored in original package at 20°C and 50% relative humidity.

*Thickness*

Plain-backed Dual Lock Reclosable Fasteners have a thickness of 2.57 mm (+/-0.25 mm). The engaged thicknesses of the piece parts combined with other Dual Lock parts are listed on the thickness table on page 7.

*Application*

Test the 3M Dual Lock / Acrylic Foam Tape construction on the appropriate substrate under the typical loading conditions (static, dynamic, temperature and load).

Given the variety of factors that can affect the use and performance of a 3M product, the user is solely responsible for evaluating the 3M product and determining whether it is fit for a particular purpose and suitable for the user's method of application.

3M Dual Lock reclosable fastener strength is proportional to the fastening contact area.

Please make sure that the 3M Dual Lock area is appropriately in size to guarantee static and dynamic load, which is needed for this attachment application.

Whenever possible, design one side of the Dual Lock reclosable fasteners to be larger than the mating side. This will allow for variability or mismatch in Dual Lock reclosable fastener alignment positions, and ensure 100% fastening area contact. Another approach would be to design two rectangular shaped fasteners so that they can be engaged in a cross-web/perpendicular pattern.

In order to avoid any cleavage of the Dual Lock parts, please make sure that the parts are attached plane parallel. Cleavage mode disengagement greatly reduces fastening strength.

The initial adhesion of Acrylic Foam Tape increases with time to provide a durable, high performance bond between the Dual Lock and the substrate. To get an optimized bond, surfaces must be clean, dry and as flat as possible, and show a good fit. Decisive for the increase in adhesion force is the overall contact of the area to be bonded. The contact is being forced by pressure.

Dual Lock reclosable fastener disengagement strength / performance is strongest in direct tensile.

*IMDS*

Refer to <http://www.mdssystem.com>

## Construction Height

Typical construction heights of different 3M Dual Lock combinations.

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

		Engaged 3M Dual Lock Thickness in mm (without liner)									
DL Typ*	Plain	468MP	5428	5580	GT6008	5361	PX5011	GT6012	5356	5745	4225
Plain	3,8	3,9	4,3	4,6	4,6	4,9	4,9	5,0	5,3	5,8	7,0
468MP		4,1	4,4	4,7	4,7	5,0	5,0	5,1	5,5	5,9	7,1
5428			4,7	5,1	5,1	5,4	5,4	5,5	5,8	6,2	7,4
5580				5,4	5,4	5,7	5,7	5,8	6,1	6,6	7,8
GT6008					5,4	5,7	5,7	5,8	6,1	6,6	7,8
5361						6,0	6,0	6,1	6,4	6,9	8,1
PX5011							6,0	6,1	6,4	6,9	8,1
GT6012								6,2	6,5	7,0	8,2
5356									6,8	7,3	8,5
5745										7,8	9,3
4225											10,2

\*NOTE: DL Type is either DL170, DL250 or DL400

Tolerance on engaged thickness of pressure sensitive Dual Lock™ ± 0.5 mm

Tolerance on engaged thickness of plain backed Dual Lock™ ± 0.35 mm.

Tension Mode:



Compression Mode:



## 90° Peel Adhesion to Stainless Steel

Typical values with 3M Dual Lock Backing

90° Peel Adhesion to Stainless Steel*** Typical Values with 3M Dual Lock Backing		
Dual Lock-Type* / Tape	After 20 minutes Room Temperature (RT) [N / 12.7 mm]	After 72 hours Room Temperature (RT) [N / 12.7 mm]
DL / 468MP	14	19
DL / 5428	29	34
DL / 5580	34	40
DL / GT6008	27	34**
DL / 5361	36	44**
DL / PX5011	49	50**
DL / GT6012	31	38**
DL / 5356	40	45
DL / 5745	35	37**
DL / 4225	54	57**

\* DL Type either DL 170, 250 or DL 400

\*\* After 3 days at RT a foam split can appear

\*\*\* Test according to 3MTM LS068 with crosshead speed 300 mm/min, 23°C and 50% R.H.

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