

**If you need a solution
call 3M first**

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call 3M first**





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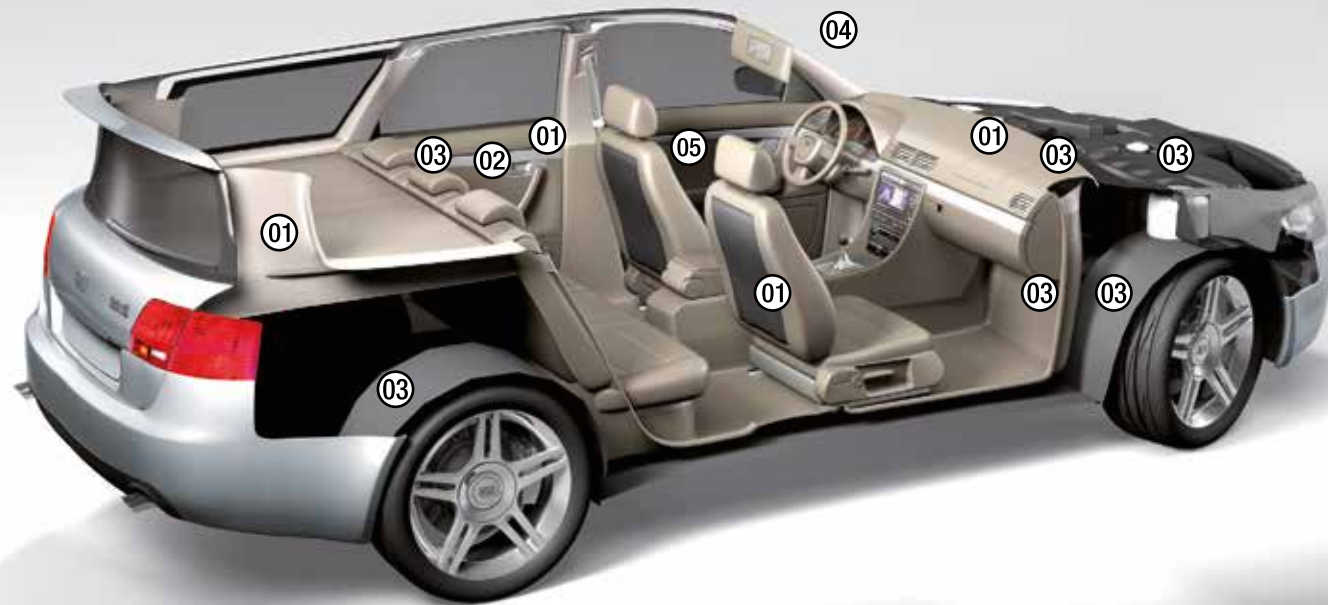
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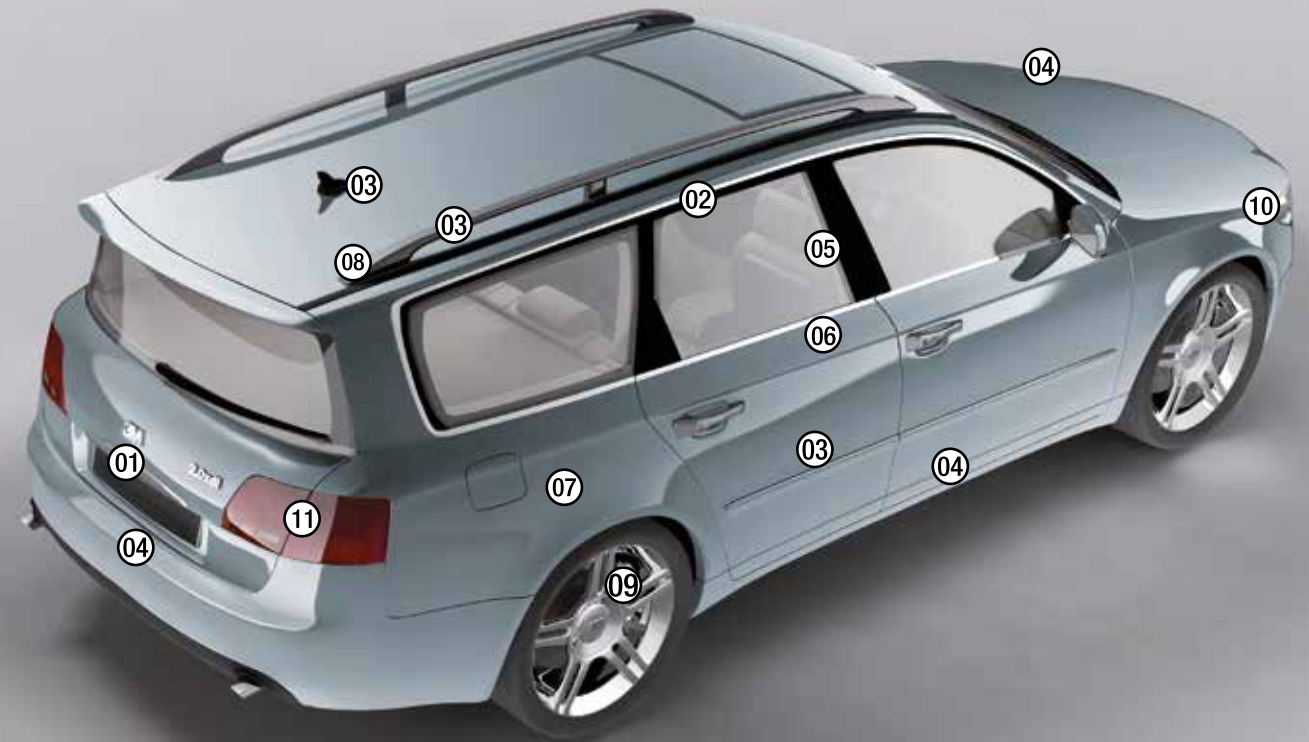
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Exterior

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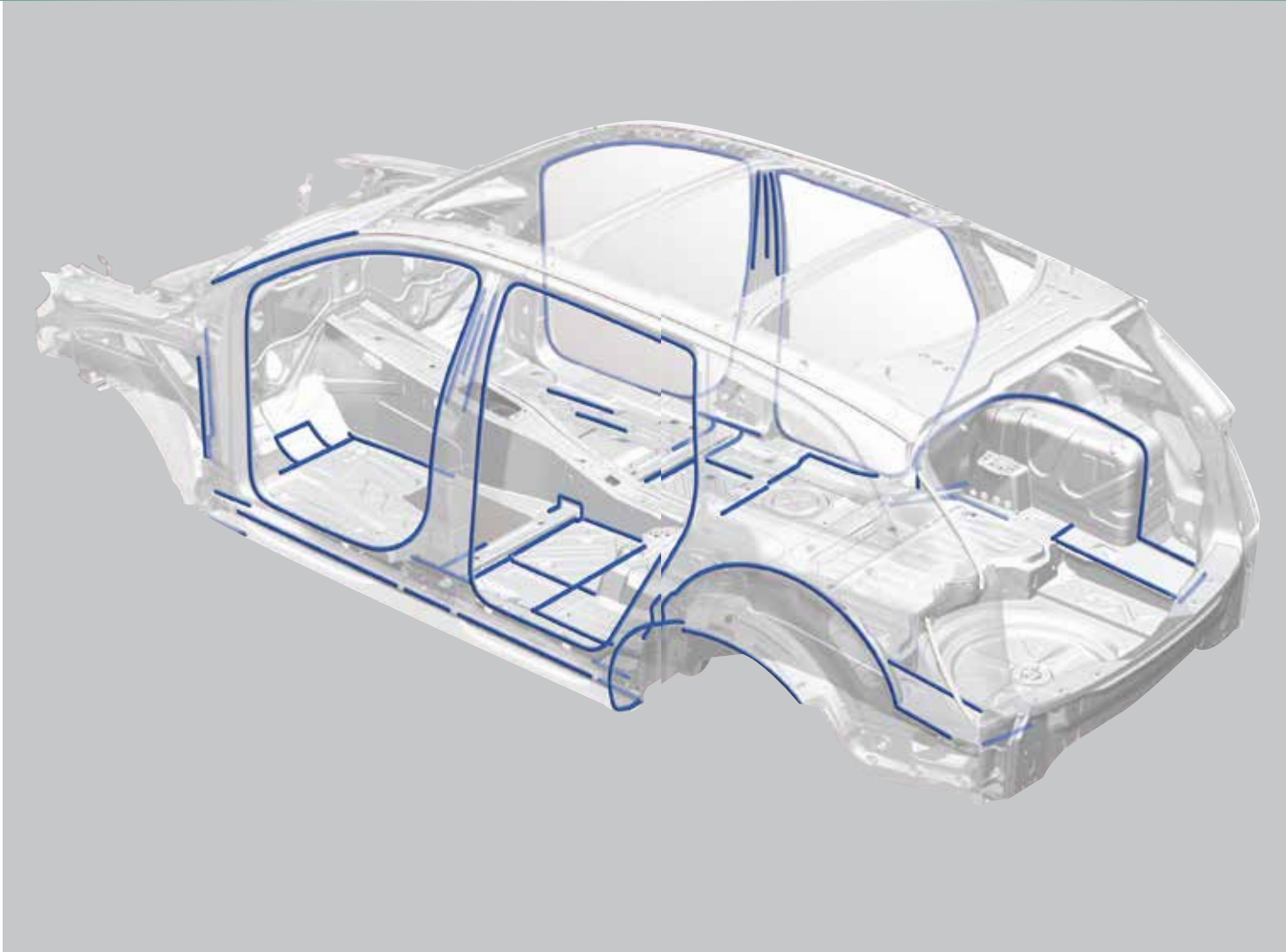
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3M™ Structural Adhesives
Primary body structure and closure panels

3M™ Structural Adhesive Films
Door hinge washers and locating plates

3M™ Melt Sealing Tapes
Panel joint/edge seal,hard chipping prevention and hole seal



3M™ Structural Adhesives are designed to bond primary body structure and closure panels. On aluminium and steel they ensure robust bonds and demonstrate their quality even when joining composite materials.They offer wide range of technologies (heat cure/low temp cure) and chemistries (epoxy, acrylate, polyurethanes).

3M's product portfolio includes SA 5027, SA 7036, SA 9820 and SA9822 to meet a variety of application needs.

Product features of 3M™ Structural Adhesives :

- Highly crash tolerant (i.e. reduction of spot welds)
- Enables de-gauged panels and structures
- Improved dimensional stability of the part (reduced panel distortion including aluminum) during cure
- Broad curing temperature profile, making it suitable for high heat sink areas
- Long shelf life and open time
- 2K products which allows faster curing

Advantages to using 3M™ Structural Adhesives :

- Toughened for high fractured energy
- Improved stress distribution
- Induction curable for quick panel lock-up
- Retains part registration and reduces distortion
- Lower cure temperatures for aluminum and composite bonding



Product	Color	Mix Ratio by Volume	Application
SA 9850	Purple	1K	Impact resistant structural bonding of steel and aluminium
SA 5027	Black*	2K 2.0 B : 1.0 A	Structural bonding of steel,aluminium, SMC panels
SA 7036	Black*	2K 4.0 B : 1.0 A	Structural bonding of steel components aluminium
SA 9820	Orange*	2K 4.0 B : 1.0 A	High crash resistant structural bonding of aluminium and composites
SA 9822	Yellow*	2K 4.0 B : 1.0 A	Structural bonding of steel components

*Mixed Adhesive

3M™ Structural Bonding Tapes



3M™ Structural Bonding Tape is formulated for bonding hardware to automotive glass and sheet metal where a structural bond is needed. It is applied as a pressure-sensitive tape and then heat cured to develop structural strength. The system offers ease of handling and installation with the tape pre-applied to hardware and packaging that allows for automation.

Advantages to using 3M™ Structural Bonding Tape :

- Excellent performance due to less degradation from plasticizer migration when using pumpable sealers.
- Elimination of alignment problems.
- High retention strength, while still allowing for serviceability.
- 3M™ Temperature Monitor Mark on packaging ensures the proper handling of clips, reducing the number of rejected parts.
- Requires minimal additional equipment for application.
- Offers design flexibility through the elimination of welds.
- Ease of handling.



Product	Thickness	Color	Application
9214	0.510 mm	Black	Bonding rear view mirror buttons and other hardware to automotive glass.
9263	0.635 mm	Black	Bonding rear view mirror buttons and other hardware to automotive glass.
9270	0.630 mm	Black	Bonding rear view mirror buttons and other hardware to automotive glass.
9259	1.000 mm	White	Bonding of mechanical attachment clips to vehicle bodies, attachment of plastic or metal mechanical clips to e-coat, sealer or primer.



3M™ Fastener Adhesives and Thread Sealants



3M™ Fastener Adhesives and Thread Sealants aid in the anchoring of threaded fasteners and help withstand extreme conditions in the engine compartment. 3M™ Fastener Adhesives and Thread Sealants are pre-applied to the threaded fastener at the applicator providing robust structural bonding and sealing performance. Typical applications are fasteners for the engine compartment or safety-related parts.

Advantages to using 3M™ Fastener Adhesives and Thread Sealants:

- High torque values on coated fasteners and resistance to heat, automotive fluids, vibration, thermal and mechanical shock.
- Flow coatable formula allows controlled application to fasteners; viscosity can be adjusted to achieve target coating weights.
- Two-part, microencapsulated structure provides extended shelf life (bulk adhesive and coated fasteners), controlled reactivity (adhesive activates and cures upon insertion) and reusability (additional capsules break with each re-insertion).



3M™ Fastener Adhesives 2353 (blue) and 2510 (orange) are microencapsulated, room-temperature curing adhesives that enhance the anchorage of threaded fasteners. The adhesives are designed to be coated on the fasteners and dried; they remain dormant until the shearing action of engaging the fastener into a nut or threaded cavity breaks the capsules and allows the adhesive to cure.

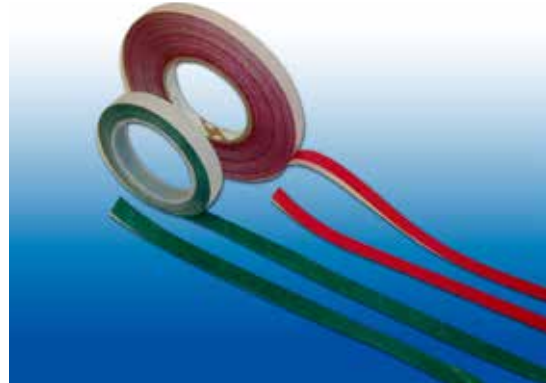
3M™ Thread Sealant 4291 is a water-based product designed to be pre-applied to threaded fasteners, providing excellent resistance to automotive fluids and withstanding high temperatures and pressures.

Product	Color	Temperature	Application
2353	Blue/Yellow	Max. 116°C	Fastener Adhesive
2510	Orange/Neutral	Max. 177°C	Fastener Adhesive
4291	White	Max. 149°C	Thread Sealant



3M™ Structural Adhesive Films

3M™ Structural Adhesive Films (SAF) **6045** and **6068** are structural adhesives in film form, suitable for many types of bonding applications. 3M™ SAF is a proven system especially for bonding door hinge washers and locating plates in automotive body operations to facilitate door installation, hinge bracket reinforcements, roof bows and other brackets. The bonded washers allow doors to be removed after painting, trimmed out in an off-line operation, and then conveniently re-attached to the body without having to be re-aligned. This greatly simplifies the vehicle assembly process.



Advantages to using 3M™ Structural Adhesive Films :

- Higher performance structural adhesive
- Reduction of welding
- Used in areas where it is uneconomic to set up fully robotic paste adhesive application systems
- Used in problem areas to improve strength and stiffness, often combined with spot welds or rivets
- Purchase-In Assembly (adhesive applied by supplier of part) for high volume production.
- Low volume applications

Product	Color	Nominal Thickness (mm)	Application	Form
SAF 6068	Red	0.4 / 0.2	Structural Bonding of Metal to Metal	Roll or diecut
SAF 6045	Green	0.3	Structural Bonding of Metal to Metal'	Roll or diecut



Hinge Washer application

3M™ Melt Sealing Tape

3M™ Melt Sealing Tapes (MST) are heat curable sealing tapes that provide good painted appearance and good sealing property after heating. Since they are one-side adhesive tapes with high modulus before heating, they provide good workability. MST can be used for panel joint seal, panel edge seal, hard chipping prevention, hole seal and replacement for molded parts.



Advantages to using 3M™ Melt Sealing Tape:

■ Mechanical durability

Doesn't include any plasticizer etc., and excels in weather resistance and durability. Provides permanent corrosion protection especially in joints that are subject to movement and vibration.



Bonding of ABC pillars to the roof

■ Best method of application

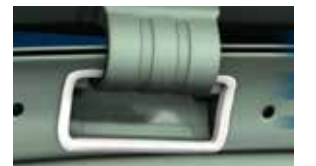
Simple to apply in positions with restricted areas. Yields high quality reproducible results and can be applied manually, semi-manually or automatically. Die-cut parts can be matched to any geometry.



Die-cut parts

■ Gap filling

Just one piece of MST can accommodate a large gap and smooth. Melts at approximately 140°, forms itself into the vehicle geometry and cures by cross linking.



Junction of the reinforcement of the roof plate in hinge area

■ High quality and excellent visual appearance

Leak proof, can be over painted without any problem and provides the same painted appearance with painted panel. Remains stable even under stress. High quality finish of the car surface is achieved.



Surface finish compared to conventional PVC sealers.

Product	Tape		Liner	
	Thickness	Color	Color	Material
5230	0.5 mm	White	Transparent red	Polyethylene
5231	1.0 mm	White	Transparent red	Polyethylene
5232	1.5 mm	White	Transparent red	Polyethylene



Heat Curable Acrylic Adhesive (Tack-free Type)



3M Automotive Melt Sealing Tape Application

3M™ Acrylic Foam Tapes

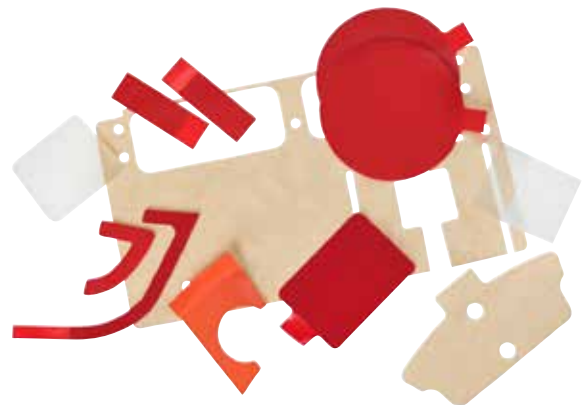


3M™ Acrylic Foam Tapes are designed to adhere to a wide variety of paint systems, including low surface energy and improved scratch- and mar-resistant paints. These double-coated tapes combine acrylic adhesives with viscoelastic foam cores, offering unique adhesion and stress relaxation properties and resistance to environmental conditions for the best long-term performance.

3M offers pressure sensitive and heat activated acrylic foam tapes for a variety of applications.

- **3M™ Pressure Sensitive Acrylic Foam Tapes** are proven high-performance attachment systems for bonding automotive accessory and trim parts.
- **3M™ Heat Activated Acrylic Foam Tapes** make the job of attaching weatherstrips and other seals easier. 3M's weatherstrip attachment method is offered as a system, complete with equipment and support necessary to laminate the tape to weatherstrip and apply the weatherstrip to the vehicle.

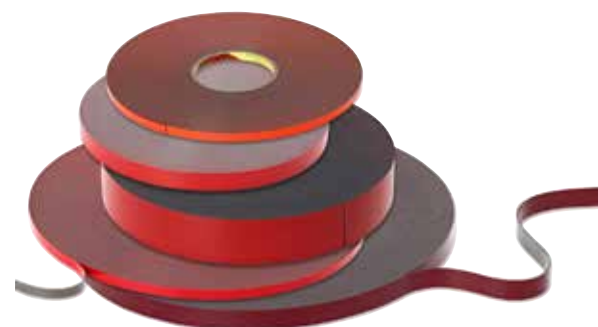
3M Acrylic Foam Tapes are available in die-cut, level wound roll, standard roll forms in various thicknesses.



Die-cut



Level wound roll



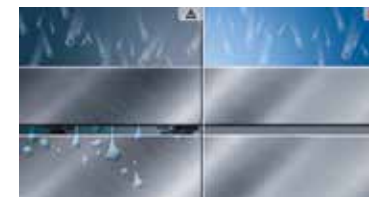
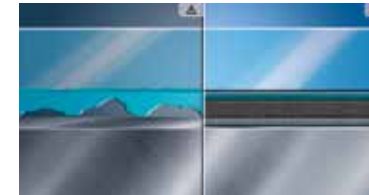
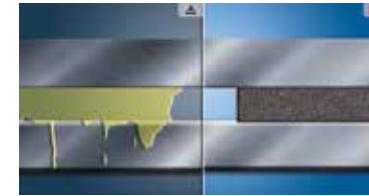
Standard roll



3M Automotive Acrylic Foam
Tape Joining Technology

3M™ Acrylic Foam Tapes

Benefits over adhesives and mechanical fastening systems



■ Fast and clean application

Accelerated processes; unlike adhesives no cure or subsequent cleaning is required.

■ Material flexibility

Ease of adhesion to low energy surfaces, good tolerance compensation with flexible PP / EPDM rails functional systems for ribbed structures on die cuts parts.

■ Simplification of processes

Custom die-cut tapes virtually to any shape can easily be assembled.

■ Corrosion avoidance

No holes, flanges or clinch profiles for the fastening of components are required.

■ Sealing function

Homogenous bonding along the entire bonding surface which protects against moisture, dust, noise and other external influences.

■ Weight reduction

Significant weight advantage over the mechanical fastening.

■ Increased design flexibility

Aesthetically appealing joints; unlike screws or clips the joints will remain invisible.

■ Cost reduction

Possibilities of automation, faster application and less rework.



Engine hood sealing



License plate



Radiator grill / Chrome trim



Sensors



Water box profile



Antenna amplifier/electronic units



Window lace, -frame



Rain/light sensors



A,B,C column



Door sealing



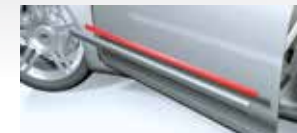
Wing mirror



Inlay in doortread



Wheel house extension



Body side molding



Door sill cover



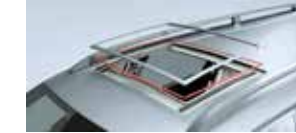
Chassis beam cover



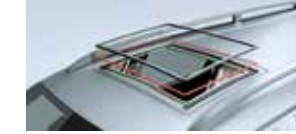
Antenna



Roof edge sealing/roof ditch



Sunroof frame



Sunroof sealing



Spoiler



Rear light/reflector sealing



Chrome trim



Emblems, logos, letterings

3M™ Acrylic Foam Tapes

Pressure Sensitive Acrylic Foam Tape Product List				
Product	Thickness (mm)	Construction		
		Additional Adhesive Liner-Side (LS)	Self-Adhesive Core (SS)	Additional Adhesive Non-Liner-Side (NLS)
5363	0,4		SS	
5428	0,45	AR7	SS	
LT 2005	0,5		SS	
LT 1006	0,6		SS	
GT 6006	0,6		SS	
4222	0,8		SS	
GT 6008	0,8		SS	
GTI 6508	0,8	DS8	SS	
GTE 6208	0,8	AR7	SS	
5580	0,8	AR7	SS	
EX 4008	0,8	JL-2	SS	VR 1
5670	0,8	TX1	SS	
5361	1,1	AR7	SS	
PT 1100	1,1	VR 2	SS	VR 1
EX 4011	1,1	JL-2	SS	VR 1
5673	1,1	TX1	SS	
5605	1,1	AR7	SS	TX1
GTE 6112	1,1	TX1	SS	TX1
4205	1,1	AR5	SS	AR5
GT 6012	1,2		SS	
GTI 6512	1,2	DS8	SS	
GTE 6212	1,2	AR7	SS	
GTE 6215	1.5	AR7	SS	
PT 1500	1.5	VR 2	SS	VR 1
5356	1.5	AR7	SS	AR7
5745	2	AR7	SS	
5390	2.3	AR7	SS	AR7
4225	3.2	AR5	SS	AR5
RT 80xx series*	0.2 - 4.0		SS	
GT 71xx series**	0.2- 4.0		SS	

* ONLY for Toyota
** ONLY for JOEMs

3M™ Acrylic Foam Tapes

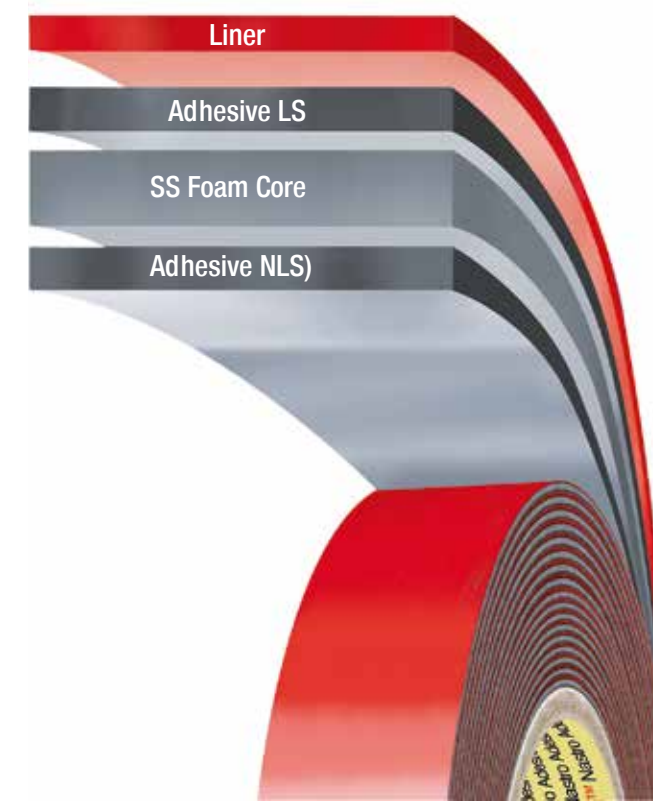
Heat Activated Acrylic Foam Tape Product List				
Product	Thickness (mm)	Construction		
		Additional Adhesive Liner-Side (LS)	Self-Adhesive Core (SS)	Additional Adhesive Non-Liner-Side (NLS)
GSE 9004	0,4		SS	E2
5401	0,45	AR7	SS	E1
5609	0,8		SS	E2
5608	0,8	AR7	SS	E2
5338	0,8	AR7	SS	E1
5339	1,1	AR7	SS	E1
5402	1,1	AR7	SS	E2
ST 1200	1,2	VR2	SS	E2
WT 4112	1,2	JL-2	SS	E2

Legend Adhesive

E 2	Heat activatable, for EPDM and EPDM/PP-materials
E 1	Heat activatable, for EPDM and EPDM/PP-materials
TX 1	Good adhesion on PP and PMMA
JL-2	Excellent initial and final tack; especially on modern, scratch-/mar-resistant paints
VR 1 VR 2	Very good initial and final tack; especially on modern, scratch-/mar-resistant paints
AR 7	High initial tack on many automotive paints
AR 5	High initial tack on many automotive paints
DS 8	Improved initial and final tack on many paint systems and substrates
SS	Selfstick acrylate foam core with good adhesion on many substrates
	No additional adhesive

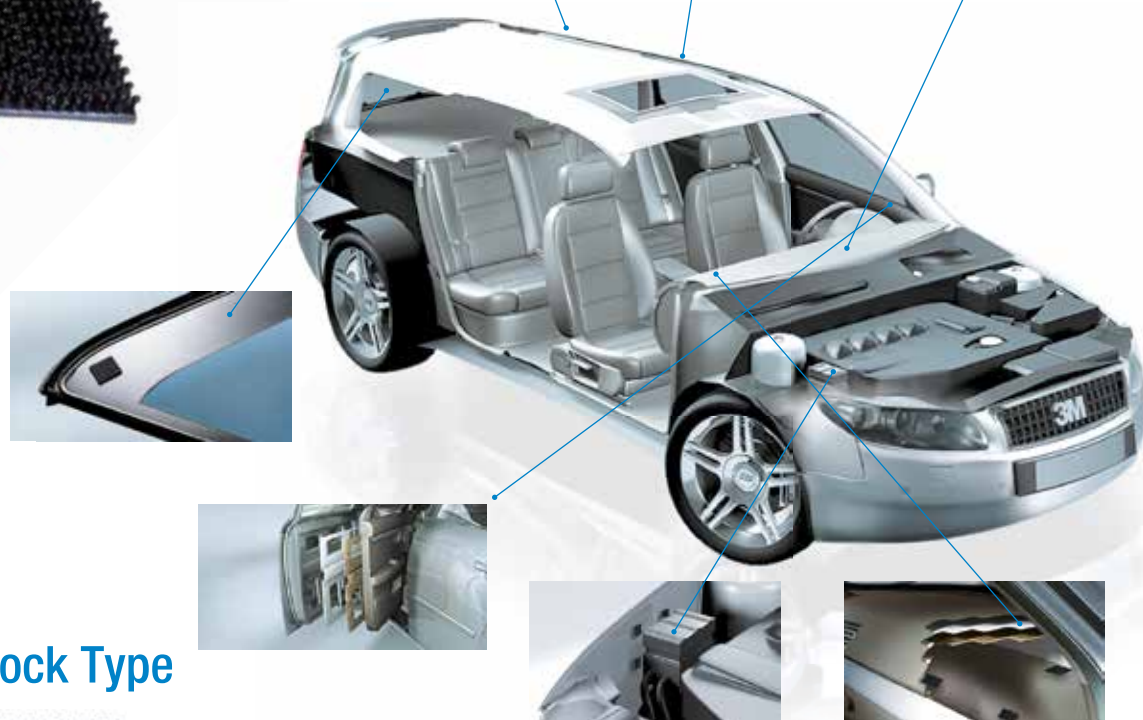


3M Automotive Acrylic
Foam Tape Sealing Applications





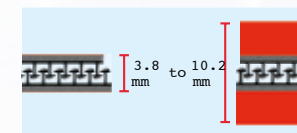
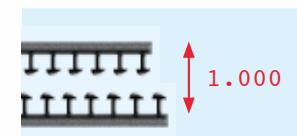
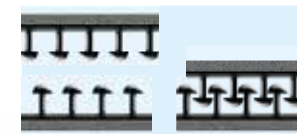
3M™ Dual Lock is a great alternative to current attachment solutions, like clips, screws or hidden fasteners. 3M™ Dual Lock Fastening Systems are reclosable, positive-locking, blind fasteners that feature mushroom-shaped polyolefin stems on a continuous backing. When pressed together these mushroom-shaped stems interlock to provide a strong reliable attachment. 3M™ 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. Environmental stability range for plain dual Lock -40°C to 120°C.



3M™ Dual Lock Type

DL 400 (62 stems/cm²)DL 250 (39 stems/cm²)DL 170 (26 stems/cm²)

- Dual Lock Fasteners are available in three stem densities: 170, 250 or 400 stems/inch².
- With different Dual Lock combinations it is possible to achieve different load levels.
- Recommended combination:
DL400/DL250 is suitable for 95 % of all applications.



■ Invisible Attachment

Dual Lock can be positioned on the piece backing without damaging the surface

■ Easy Positioning

High productivity through easy mounting Audible Engagement

■ Easy Alignment

It can be closed in parallel or cross alignment

■ Reclosability

Reclosable up to 1000 times

Easy disassembly if needed

■ Reduces vibration

Together with 3M™ Acrylic Foam™ Tape

■ Bridging

From 3.8 to 10.2 mm

■ Wide Application Possibilities

Dual Lock is suitable for different applications and offers high design flexibility

It can be applied together with 3M™ Acrylic Foam™ Tape or adhesive, by ultrasound welding, screws, self-sustained as slide-in or pop-in, etc.

■ Available in a Variety of Forms

Combined with 3M™ Acrylic Foam™ Tape as rolls, or parts-on-a-roll

Die cuts single or sandwich construction

Pop-ins, slide-ins, rigid-back parts for different substrate thickness and hole sizes

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

Construction Heights Typical construction heights of different 3M™ Dual Lock™ combinations.											
Engaged Dual Lock Thickness in mm (without liner)											
DL-Type**	Plain	468 MP	5428	5580	GT6008	5361	5673	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
468 MP		0,45	4.1	4.4	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
5673							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.

3M™ Dual Lock™ Standard Rolls*									
DL-Type**	Tape-Thickness (mm)	Width (mm)							Length (m)
		10	12,5	15	20	25	30	50	
Plainback	0	30	30	46	46	46	46	46	
468MP	0.1t	20	30	46	46	46	46	46	
5428	0.4	30	30	46	46	46	46	46	
GT6008	0.8	30	30	46	46	46	46	46	
5580	0.8	30	30	46	46	46	46	46	
GT6012	1.2	30	30	46	46	46	46	46	
5361	1.1	20	20	46	46	46	46	46	
5673	1.1	20	20	46	46	46	46	46	
5356	1.5	15	15	30	30	30	30	30	
5745	2.0	15	15	30	30	30	30	30	
4225	3.2	15	15	30	30	30	30	30	

3M™ Dual Lock™ Standard Die Cuts							
Length (mm)	Width (mm)						
	12.5	15	20	25	30	40	50
10	●	●	●	●	●	●	●
15	●	●	●	●	●	●	●
20	●		●	●	●	●	●
25	●			●	●	●	●
30	●				●	●	●
35	●	●	●	●	●	●	●
40	●					●	●
50	●						●
60	●	●	●	●	●	●	●

* The shown products are a small sample of the available portfolio.

3M™ Dual Lock™ Standard Piece Parts*							
Product Type	Stems per 2.54 cm²	DL-Size (mm)	Target Hole Size (mm)	Post Length (mm)	Panel Thickness (mm)	Number of Holes	Diameter (mm)
SJ 3209 Pop-In	250	26 x 26	Ø 8.2 (7.9 – 8.4)	12.3	0.8 – 4.7	-	-
SJ 3749 Pop-In	400	26 x 26	Ø 8.2 (7.9 – 8.4)	12.3	0.8 – 4.7	-	-
SJ 3715 Pop-In	400	26 x 26	Ø 10 (9.93 – 10.3)	8,5	0.86 – 1.0	-	-
SJ 3827 Pop-In	400	26 x 26	6.5 (+0.03/-0.25) x 10 (+0.03/-0.25)	9,1	0.7 – 1.0	-	-
SJ 3221 Pop-In	250	20 x 20	Key Hole Slot	5,0	2.65 (2.5 – 2.8)	-	-
SJ 3731 Pop-In	400	20 x 20	Key Hole Slot	5,0	2.65 (2.5 – 2.8)	-	-
SJ 3250 Die-cut rectangular part	400	20.5 x 28	Ø 4.22	-	-	1 (center)	-
SJ 3252 Die-cut rectangular part	400	38.1 x 38.1	Ø 4.22	-	-	2 (25.0 mm hole spacing)	-
SJ 3261 Die-cut rectangular part	400	38.1 x 38.1	Ø 3.6	-	-	2 (25.0 mm hole spacing)	-
SJ 3767 Die-cut rectangular part	400	38.1 x 38.1	Ø 3.6	-	-	2 (25.0 mm hole spacing)	-
SJ 3755 Die-cut Circle	250	ca. 5.87 cm²	Ø 4.1	-	-	1 (center)	28.5
SJ 3762 Die-cut Circle Washer	400	ca. 5.87 cm²	Ø 4.1	-	-	1 (center)	28.5
SJ 3763 Die-cut Circle Washer	400	ca. 2.84 cm²	Ø 4.1	-	-	1 (center)	20.6

* The shown products are a small sample of the available portfolio.



3M™ Wheel Weight Systems combine conformable wheel balancing material and industry-leading 3M™ Automotive Attachment Tape technology to provide an all-in-one, securely attached wheel weight balancing system. Designed to have less impact on the environment than industry-standard lead wheel weights, the 3M Wheel Weight System is a proprietary product with unique properties built to meet ever-increasing needs for lead-free, quality products.

A tape-on, adhesive weight for balancing vehicle wheels made from a proprietary, high-density, lead-free composite technology enables cut-to weight, equipment simplicity and automation. The weight is securely attached to the wheel with a proven tape system.

3M™ Wheel Weight Systems are available in level wound roll and standard roll forms in various demintions.



Standard roll



Level wound roll



OEM automated application

Product	Density	Weight/ cm	Weight/ coil	Color	Dimension
TN 4015	5.6 g/cm ³	4.1 g/cm	82 kg	Silver	15 mm x 5.9 mm
TN 4019	5.6 g/cm ³	4.1 g/cm	82 kg	Silver	23 mm x 4.5 mm
TN 4023	5.6 g/cm ³	4.5 g/cm	82 kg	Silver	19 mm x 4 mm



3M Automotive
Wheel Weight Systems

Key features , advantages and benefits



■ Flexible roll design

Easy to dispense, cut to exact weight and apply, thus reduction in scrap and material used.



■ Lead-free/corrosion-free design

Replaces environmentally harmful lead wheel weights, helps eliminate corrosion of expensive wheels and will not stain wheels.



■ Improved appearance

Provided in a lighter grey color designed to blend in with the wheel , profile can also be hidden behind spokes of wheel.



■ Fewer SKUs to inventory

Provided as a roll good designed to be cut to exact weight to provide precision balancing, eliminates traditional wheel weight inventories of individual part sizes, reduced floor space required.



■ No clip-on/ bang-on

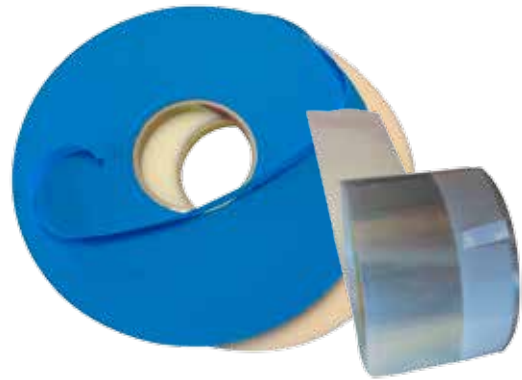
3M™ Mechanical Replacement Weights replace clip-on/bang-on mechanical weights. One profile conforms to flanged rim, will not scratch, no hammering required, will not interfere with wheel covers. Reduction of wheel damage leads to improved appearance.



■ Proven durability and performance

Successful attachment of millions of trim and accessory parts on vehicles for over 40 years stays adhered and helps keep wheels balanced, increasing ride quality.

3M™ Tabbings and Splicing Tapes & Primers



3M™ Tabbings and Splicing Tapes are provided to assist in processing 3M™ Acrylic Foam Tapes, and ensure that the liner can be removed cleanly and efficiently before the tape is put into use. They show an excellent adherence to the liner of 3M™ Acrylic Foam Tapes.

3M™ Tabbings and Splicing Tapes 5300 and 5699 are especially developed for siliconized and polyethylene liners, and are offered in clear, red or blue colors.

These tapes provide high tack and good strength to liners and can be used for manual applications without special equipment.

3M™ Heat-activatable Tabbings Tapes 5081 (blue) and 5082 (clear) are heat sealing polyamide/polyethylene composite foils (heat-activatable foils) that are used for tabbing with liners of 3M™ Acrylic Foam Tapes (including ST- and EX series).



3M™ Adhesion Promoters are liquid primers used for enhancing adhesion of 3M™ Acrylic Foam Tapes for interior and exterior trim applications.

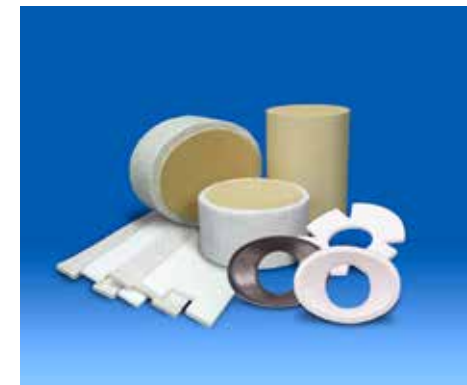
3M™ Adhesion Promoters are most often used to raise the substrate surface energy of low surface energy plastics such as TPO, PP, PPO, PC, ABS, other plastic blends/alloys and glass allowing for increased short and long-term adhesion levels of 3M™ Acrylic Foam Tape adhesives.

■ 3M™ Adhesion Promoter 4297 and 4298 are liquid primers used for most low surface energy plastics. This would include common low surface energy plastics used for automotive dash and interior trim applications.

■ 3M™ Adhesion Promoter 4299 is made for priming of glass surfaces in order to get an optimal bond between glass and 3M™ Acrylic Foam Tapes. The primer bond gives an excellent humidity resistance.

Product	Color	Total Thickness (mm)	Adhesive	Application
5300	Transparent	0.13	Pressure Sensitive	Tabbing to PE liners
5699	Transparent	0.100	Pressure Sensitive	Tabbing to siliconized PE liners
5081	Blue	0.105	Heat Activated	Tabbing to PE liners
5082	Clear	0.105	Heat Activated	Tabbing to PE liners

Product	Color	Application	UV visibility
4297	Clear, light yellow	Special adhesion promoter for ABS, PVC and PC	NO
4298	Straw	General purpose adhesion promoter for materials with low surface energy	YES
4299	Transparent	Special adhesion promoter for glass	NO



3M™ Interam® (Mat Mount and Endcone Insulation products) is a comprehensive product portfolio encompassing solutions for all ranges of temperature and application needs encountered in a catalytic converter. The product offerings range from mat mounts to molded endcone insulation to an agent designed to reduce erosion. In addition to products, 3M offers testing resources, concept consultation, in-depth design expertise and technical support throughout all phases of design and validation.

3M™ Interam® Mat Mounts designed to handle temperatures up to 1,000°C, compensate for the extreme differences in the expansion of metal and ceramics and protect the substrates from shocks and vibrations when the catalytic converter is in use.

Some primary features of Interam® Insulation Products include the capability to:

- Hold the coated monolith in place despite substantial differences in the thermal expansion of the monolith and the metal can.
- Cushion the monolith from road shock and vibration.
- Seal the monolith perimeter to prevent exhaust gas bypass.
- Maintain mounting and insulating system durability.
- Provide thermal insulation which:
 - Lowers the outside temperature of the catalytic converter.
 - Reduces the radial thermal gradient in the ceramic monolith, increasing the internal temperature and conversion efficiency.

Representative portfolio of 3M™ Interam® includes 1600HTE, 5000NC and 7000NC. 3M collaborates to meet specific application requirements. For further details please contact 3M.





3M™ Paint Protection Films (PPF) are high performance protective films which are almost invisible. PPF helps to protect automotive paint and other vulnerable surfaces from stone chips, scratches, bug damage, road tar stains, automotive fluid stains and punishing outdoor weathering.

3M's product portfolio allows the optimisation of the respective application in regards to :

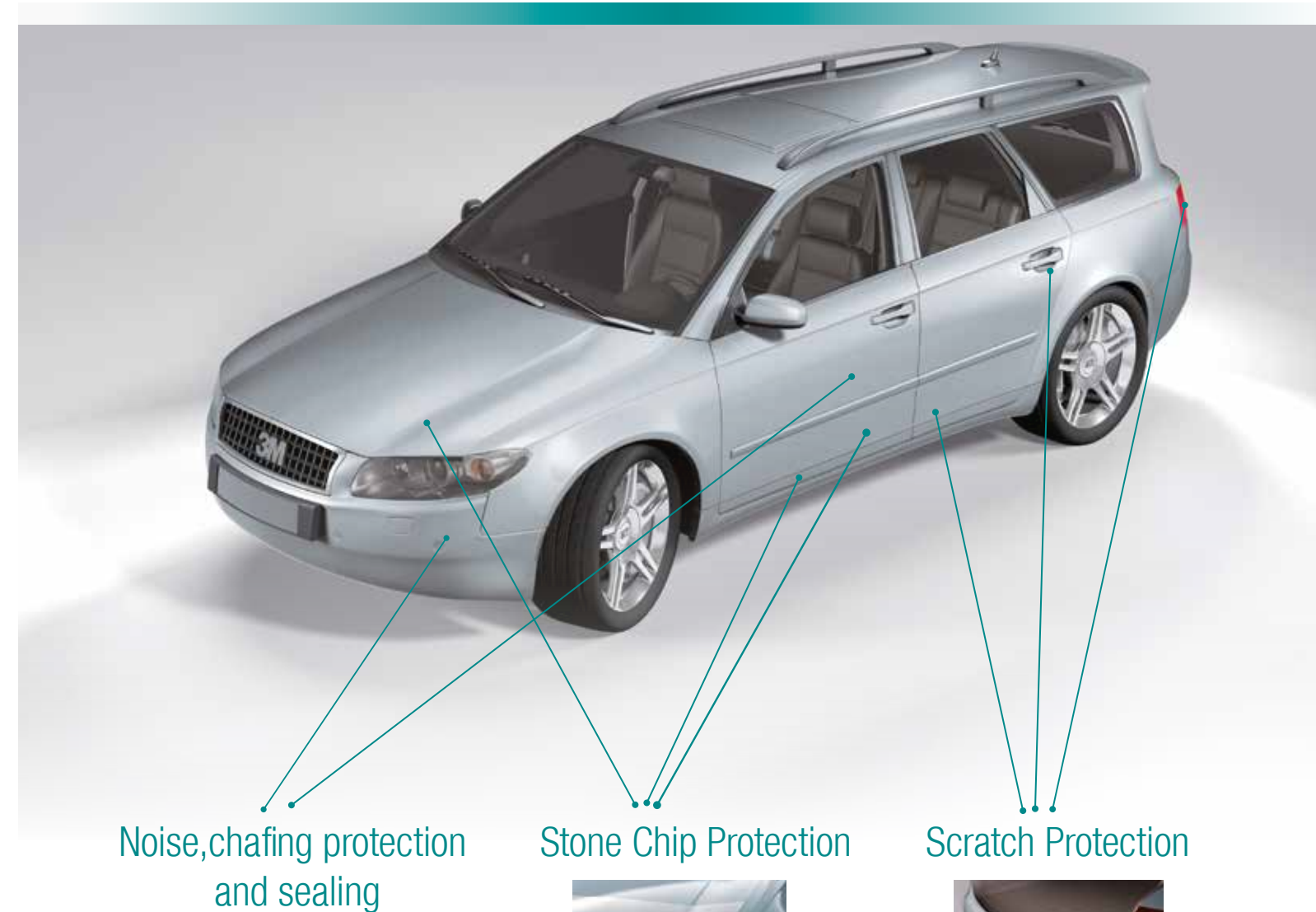
- Chemical and mechanical resistance
- Long-term resistance
- Long-term ageing resistance
- Adaptability to complex contour
- Good conformability for applications around corners and edges.

3M™ PPF die-cuts can be manually applied to the leading edges of hoods, wheel flairs, door openings and other exposed paint surfaces to provide transparent, durable protection from outside elements. 3M™ PPF helps consumers protect their long-term investment.

Technical benefits of 3M™ PPF also include :

- Excellent initial clarity and gloss retention.
- The adhesive ensures a reliable bond under temperature fluctuations and humidity.
- Offered in a range of thicknesses – thinner films for low impact areas and thicker ones for high-impact areas.
- Customer-optimised design and application; can be die cut according to customer specified geometries.
- Manual application to relatively smooth or complex surfaces.

Product No.	Clearcoat	Film	Gloss	Thickness
PU 8591	-	PU	Medium	0.360 mm
PU 8592	-	PU	Medium	0.200 mm
PU 5025	-	PU	High	0.295 mm
PUL 2006	Standard	PU	High	0.210 mm
PNUE 9260E	Standard	TPO (MOF)	High	0.290 mm
P-450	Standard	TPO (MOF)	High	0.140 mm
VT75100CC/CS-LD	Standard	PU	High	0.210 mm
PU 6594E	Premium	PU	High	0.340 mm
PU6595E	Premium	PU	High	0.210 mm



Material separation



Body drainage holes



Hood & bumper



Door sills



Rear door / wheel arch



Trunk Bay Loading



Door handle Recess



Door edge & door entrance

3M™ Paint Replacement Films



3M™ Paint Replacement Films (PRF) contribute to design effectiveness and reinforce the branding message while simplifying manufacturing. 3M™ PRF provide a two-tone blackout appearance around daylight openings. The films are available in textured, low gloss or high gloss finishes to match the design intent of the vehicle. Film use eliminates the paint process and cumbersome masking and de-masking, reducing reject levels.

Technical benefits of 3M™ PRF also include :

- Bubble-free application with 3M™ Comply™ adhesive technology
- Weather resistance
- Custom application tools can be designed
- Die-cuts can be manually applied to pillar, sash and belt line surfaces.
- Textured, low-gloss and high-gloss finishes
- Lower cost compared to molded applique

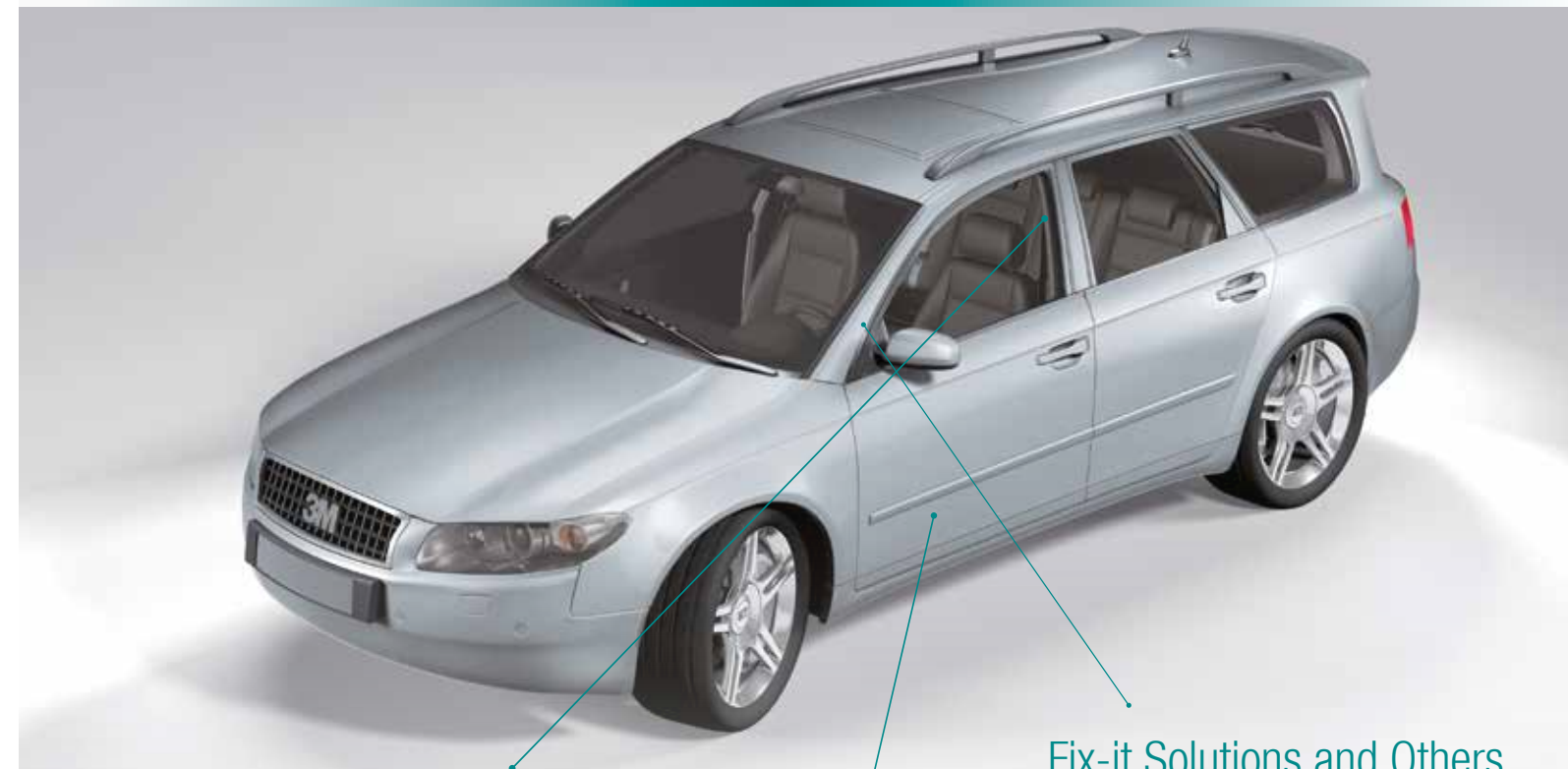
3M™ Comply™ adhesive technology

Microstructures in the adhesive facilitate the application of films. Air bubbles are easily expelled to outside via the fine channels.



Product No.	Base Film	Gloss Level	Adhesive
DCBI 477	PVC (Polyvinyl Chloride)	Matt, Textured	Standard
E 577	PVC	Matt, Textured	Macro Structured
F-777MC	PVC	Matt, Textured	Micro Comply™
F-506	PVC	Matt, Textured	Standard
FRW 3043J	PVC	Medium gloss (30% reflectivity)	Micro Comply™
FTW 9953J	PVC	High gloss (90% reflectivity)	Micro Comply™
FRA 0045J	Standard	Matt, Textured	Micro Comply™, Wrinkle-resistant
FRA 3045J	Premium	Medium gloss (30% reflectivity)	Micro Comply™
FPW2003J	PVC-Free (Polyolefin)	Medium gloss (20% reflectivity)	Micro Comply™, Wrinkle-resistant
FTA 9055J	PVC	High gloss (90% reflectivity)	Micro Comply™, Wrinkle-resistant

3M™ Paint Replacement Films



ABC pillar and Window Design

With the application of PRF to vehicle pillars, the side windows can be visually connected. This causes them to be perceived as one and therefore appear larger.



ABC Pillars



Window frame design

Vehicle Design

With the help of PRF applications, vehicle differentiation is possible quickly and without making structural changes. A smart door sill application, lateral design element or two-tone door entrance gives the vehicle a sporty look.



Door entrance



Door sill and stripe design

Fix-it Solutions and Others

PRF offer ideal solutions for limited-visibility areas that need to be blackened for visual reasons, e.g. when concealing light-coloured coatings that create unwanted contrasting colours between the window and door seals or visual gaps. PRF can also be useful for camouflage and disguise.



Fix it solutions



Camouflage solutions

3M™ Scotchcal™ Automotive Grade Colour Films



3M™ Scotchcal™ automotive grade colour films offer broad freedom of design on vehicle surfaces. All colours and design versions can be implemented on the vehicle. This makes each limited edition unique through its special design.

3M™ Scotchcal™ automotive grade colour films were developed for applications on common paint systems. They are easy to apply. The adhesion force of the adhesive increases gradually. For large-scale applications, 3M recommends films equipped with 3M™ Comply™ adhesive technology. These products have finely structured air channels in their adhesive. As a result, any air bubbles caused during application are easy to work out to the outside.

A large spectrum of film characteristics creates ideal conditions for the application of creative designs to vehicles :

- Weather resistant
- Easy to apply and dimensionally stable
- Equipped with 3M™ Comply™ adhesive technology
- Can be screen printed
- Equipped with a protective laminate

Series	Base Material	Thickness	Adhesive	Surface structure
Scotchcal film, standard	PVC	0.09 mm	High-performance acrylic adhesive, available with 3M™ Comply adhesive technology	Matt, high-gloss, structured, metallic
Scotchcal film, high adhesion force	PVC	0.09 mm	High-performance acrylic adhesive with extremely high initial adhesive force	Matt, high-gloss, structured, metallic
Scotchcal removable film	PVC	0.12 mm	Removable high-performance acrylic adhesive	Matt, high-gloss, structured, metallic

3M™ Exterior Trim Films



3M™ Exterior Trim Films (ETF) provide a metallic or highgloss black finish on plastic exterior trim parts, replacing formed metal, chrome-plated plastic or painted parts. Various trim level grades can be offered on one vehicle exterior without changing the base part design.

Advantages to using 3M™ ETF are

- Model differentiation – different finishes can be applied to the same base components
- Reduction in chrome plating operations in the plant
- Lower weight compared to metal parts
- Lower cost compared to metal parts

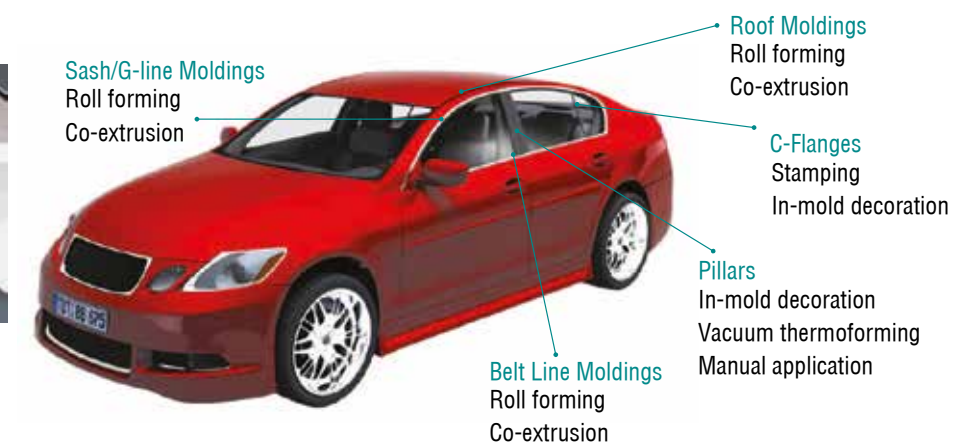
3M™ ETF are provided in three finishes :



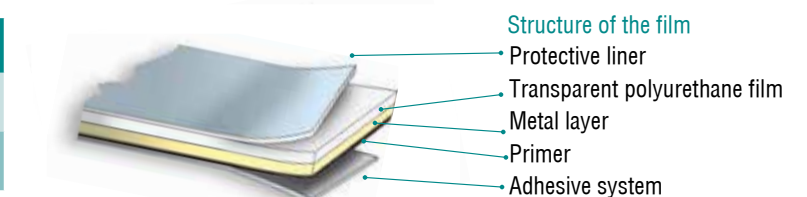
3M™ ETF provide a consistent finish on parts made from various base materials (ABS, TPO, PVC) and manufacturing processes (co-extrusion, in-mold decoration and dual vacuum thermoforming).



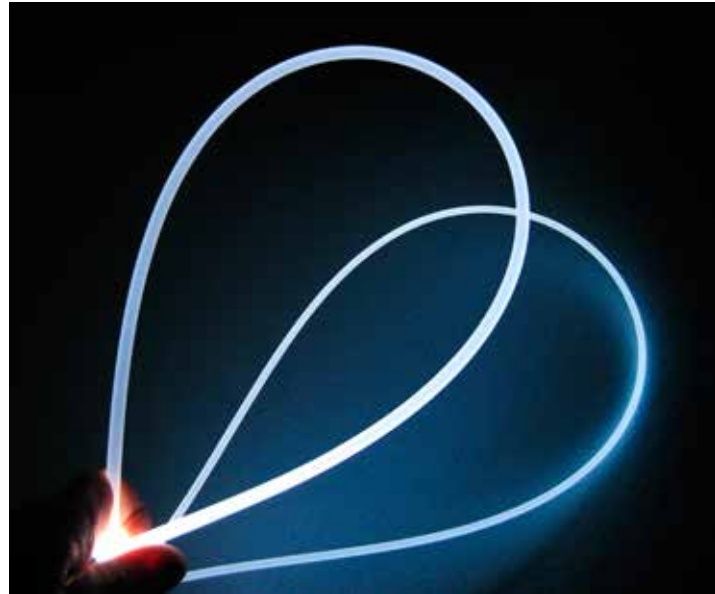
Belt Line Moldings



Product	Color	Application
FPO 8100J	High Gloss Chrome	Surface decoration of exterior trim parts
FPO 8501J	High Gloss Black	Surface decoration of exterior trim parts



3M™ Light String



3M™ Light String is a flexible, optic fiber with superior uniformity and temperature durability that can be used to create stunning lighting effects on the interior of the vehicle.

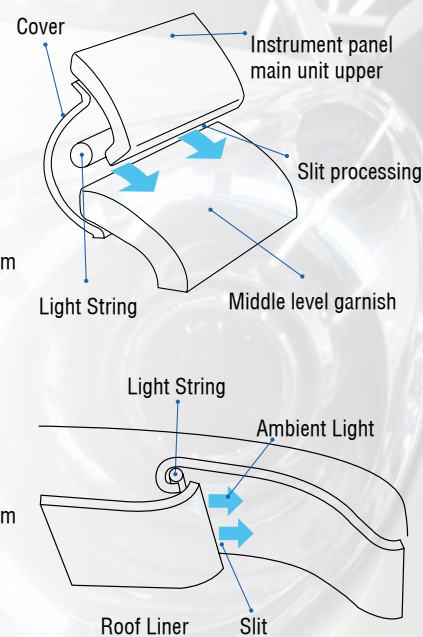
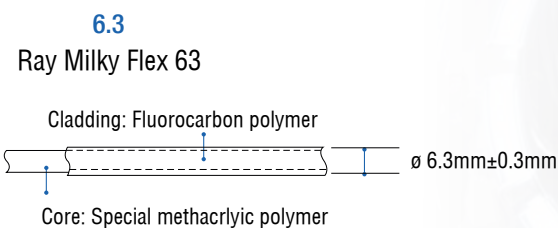
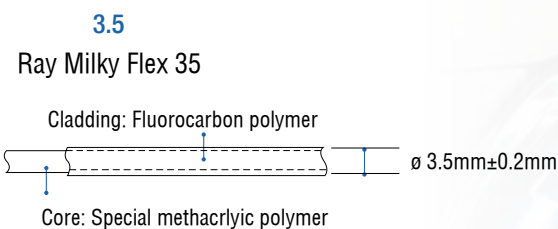
3M's Light String Technology efficiently and uniformly converts the limited amount of light from a LED over longer lengths using a special transparent methacrylic polymer core. The round, flexible light guide can easily be integrated around curved surfaces or along long, sharp lines in doors, center consoles, instrument panels and overhead consoles to give a signature look and feel to a vehicle.



Advantages to using 3M Light String:

- Excellent flexibility enables the creation of freely curved 3D light designs.
- Cut-to-length feature eliminates tooling costs, reduces development time and allows quick implementation.
- Durable construction ensures that product will not shatter during handling or installation.
- Consistent 360-degree diffuse light emission allows product to be easily integrated into vehicle without orienting parts.

Products



3M™ Uniform Lighting Lens



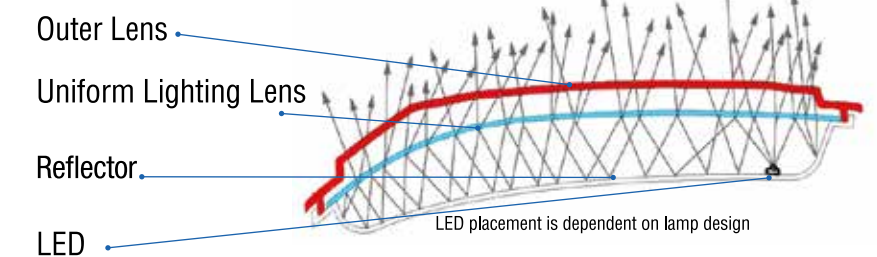
3M™ Uniform Lighting Lens provides new-to-the world optical technology for LED illuminated tail lamps. The unique light delivery system utilizes a precision engineered, micropatterned polycarbonate that provides even illumination when used as an inner lens in rear lamps.

The hollow mixing cavity design enables the creation of light-weight, signature designs with a thin profile and reduced LED content. The thermoformable, automotive grade polycarbonate enables custom shapes and reduced system complexity.

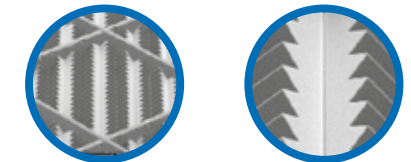
Benefits:

- Design flexibility
- Improved energy efficiency through LED reduction
- Improved light output uniformity
- Reduced weight and package space
- Reduced prototype design cycle time

Cross Section



Microstructures



Product Comparison

Tail Lamp Assembly Attributes	Typical Incandescent Lamp (GOOD)	Typical LED Lamp (BETTER)	LED Lamp with 3M Lens (BEST)
Weight	--	0	++
Reduced package space	--	+	++
Power consumption	-	+	++
Light source longevity	--	++	++
Assembly cost	++	-	+
Number of lamp components	++	-	0
Number of LEDs needed to produce uniform illumination	N/A	-- (requires multiple LEDs to produce uniform illumination)	++ (requires 1+ LEDs to produce uniform illumination)

+ = Benefit 0= Neutral -- Limitation



3M™ Automotive Design Experience

3M™ Thinsulate™ Acoustic Insulation



3M™ Thinsulate™ Acoustic Insulation significantly reduces the noise in vehicle's passenger compartment and thus increases driving comfort. Thinsulate™ Acoustic Insulation is a product family based on polyester and polypropylene micro-fibers, combining highly efficient acoustic absorption with minimal surface weight. It has hydrophobic, compressible, conformable and cavity filling properties. It enables optimized performance through technical collaboration.

Advantages to using 3M™ Thinsulate™ Acoustic Insulation:

■ Higher efficiency

Because Thinsulate™ is lightweight and less material is required in order to achieve effective acoustic absorption, Thinsulate™ can help you with achieving cost-effectiveness and weight reduction targets.



■ Hydrophobic and mold-free

The hydrophobic material can be used in vehicle areas that are frequently exposed to moisture and humidity. It provides an efficient sound absorption without any additional cost-intensive protection needed. The material is resistant to mildew; it absorbs less than one percent of its weight in water.



■ Easy installation

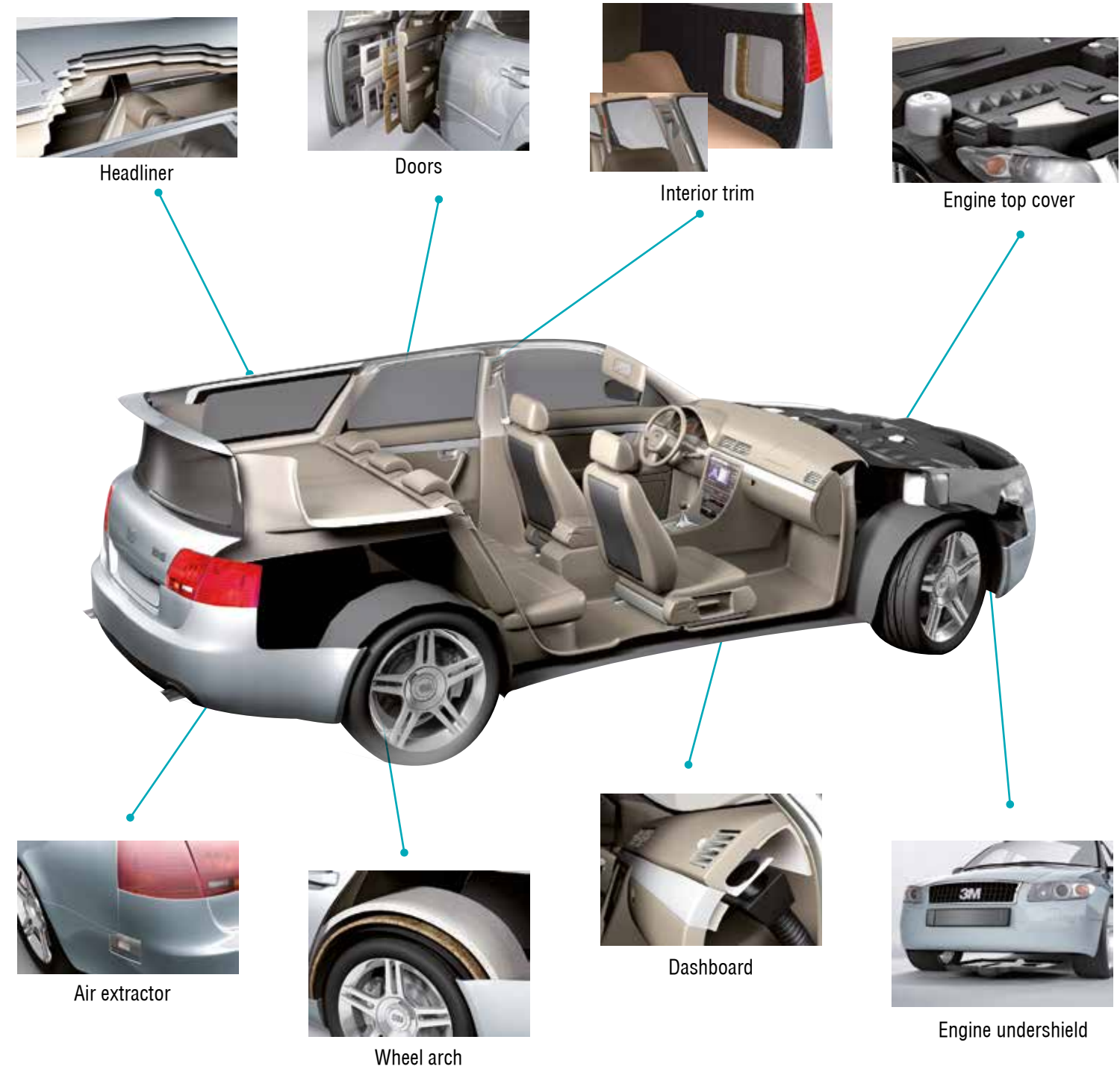
Production of acoustic parts is quick and cost-effective. Attachment is simple (e.g. through ultrasound welding). Thinsulate™ is easily die-cut, tape laminated, heat sealed, and thermally or sonically bonded to many substrates. Thinsulate™ can also be edge sealed in accordance with individual requirements in order to achieve the perfect fit and optimum acoustic insulation. Thus it can be simply integrated in production process.



■ Wide range of products

3M offers an optimized solution for nearly any purpose and specification. Thinsulate™ is available in several thicknesses and material compositions that provide medium or high frequency ranges of insulation.

3M™ Thinsulate™ Acoustic Insulation



3M Automotive
Thinsulate Acoustic Insulation

3M™ Thinsulate™ Acoustic Insulation

Product	Surface Weight (g/m²)	Thickness* (mm)	Scrim	Embossed
AU 2020-6	217	13	White PP	Both sides
AU 2002-5	290	12	Black PP	No
AU 3020-6	317	19	White PP	Both sides
AU 3002-2	345	19	Black PP	Both sides
AU 4002-6	440	26	Black PP	No
AU 4020-6	417	26	White PP	Both sides
TAI 2001	245	11	Black PP	Both sides
TAI 2027	217	13	White PP	No
TAI 2047	200	10	None	Both Sides
TAI 2099S	217	8	White PP	Both sides
TAI 3027	317	21	White PP	No
TAI 3047	300	18	None	Both Sides
TC 1503	155	16	Double white PP	No
TC 1803	190	21	Double white PP	No
TC 2303	240	27	Double white PP	No
TC 3403	340	41	Double white PP	No
TH 4320-1	260	16	White PP	Both sides
SM 200L	245	13	Black PP	No
SM 300L	345	21	Black PP	No
SM 400L	442	26	Black PP	No
SM 600L	645	42	Black PP	No

* Nominal thickness is measured using a 12 in² plate with 14 Pa (0.002 psi) applied to the sample.



3M™ Damping Foil



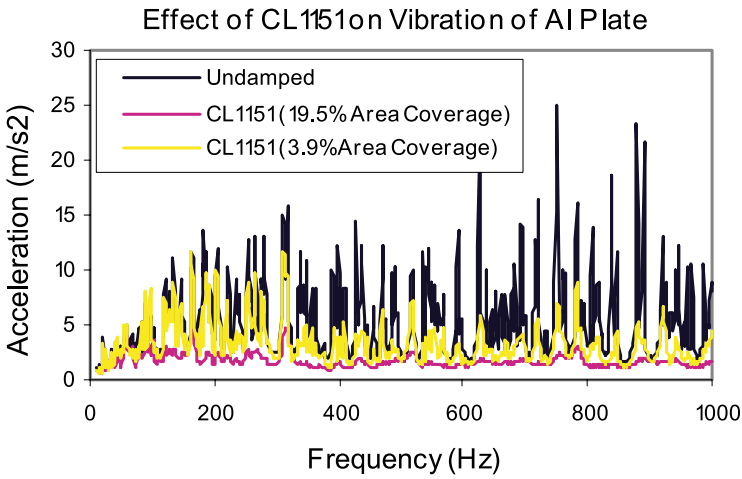
3M™ Damping Foil CL1151 is a form of vibration control used to reduce the resonant frequency of metal and composite panels, thus reducing vibration and structure-borne noise. Unique construction of a pressure sensitive viscoelastic polymer and an aluminum foil backing converts vibration to negligible heat.

Advantages to using 3M™ Damping Foil :

- Pressure sensitive adhesive assists installation
- Usable temperature range is –25° to 175°F (-32° to 80°C)
- Wear and tear on parts may be decreased
- Risk of parts loosening may be reduced
- Need for stiffeners may be eliminated
- Products can effectively damp with as little as 10% coverage

Product features of 3M™ Damping Foil CL1151 :

- Light weight products (0.83 kg/m2) provide effective damping to vehicle with minimal added mass.
- Overall thickness of 0.38 mm makes it useful for low profile applications.
- Easy release liner provides for convenient die-cutting.
- Products demonstrate excellent adhesion to steel (72N/100mm).





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