

# On Target



For Ford and Lincoln wholesalers and the collision repair industry

## Ford Provides Details on Sectioning Repair Options



Gerry Bonanni, Senior Engineer

Researching collision repair procedures and mapping out a full repair plan before work begins is not only a great rule of a thumb and a good foundation to providing a proper repair, but it is also the key piece of advice that Gerry Bonanni, senior damageability engineer for Ford Motor Company, has always stood by.

“Researching the repair ahead of time will make for a much more efficient repair. There is a huge benefit to knowing what you need to do ahead of time and taking the time to do it right,” said Bonanni.

Bonanni reiterated that position in his recent appearance in an episode of I-CAR’s

**Repairers Realm** video series, where he joined I-CAR technicians Scott VanHulle and Jason Hauboldt to discuss Ford sectioning options, using a pre-recorded video of a cab corner repair on a Ford F-150®.

The video noted the first step of the repair is to prepare the vehicle, which includes protecting elements of the vehicle not included in the repair, such as the fixed glass. The discussion then focused on the best places to cut to section.

“It’s important to note that the sectioning cut-lines provided in the official *Ford Workshop Manual* are suggestions,” said Bonanni. “As long as you stay 50 millimeters away from striker or hinge points, which is an industry standard, the best place to cut on exterior components is left up to the technician’s skill level and the type of damage on the vehicle.”

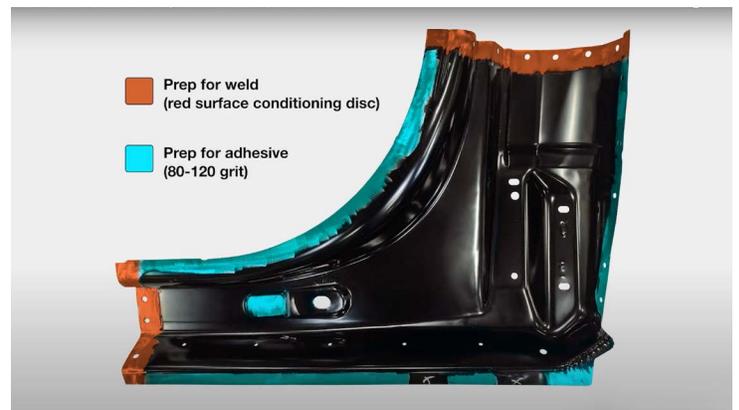
The video points out that drilling rivets to remove them is not easy and that pressing them out with proper, Ford-approved tools—such as a self-piercing rivet (SPR) gun—works better. Another tip provided when using an SPR gun is to ensure it is flush against the rivet, and to not angle it or force it into position as it could snap the die.

Bonanni noted a good repair technique is to use a panel chisel in a sideways motion to fracture the glue instead of applying heat. He also cautioned against using heat in areas of a vehicle where multiple panels are bonded together, as the heat could compromise that bond, potentially causing a more invasive repair.

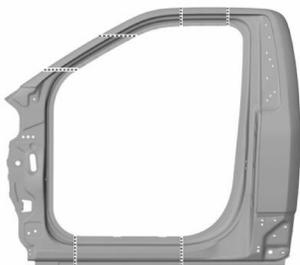
Pressing out rivets leaves a small burr on the aluminum surface, and it is important to use a belt sander to remove them. A clean aluminum surface that is not contaminated will help to ensure high-quality welds.

The video noted a sign of good craftsmanship and training is to overlay the panel that was just cut out onto the new panel, and to line it to ensure you do not cut too much of the panel (to be less invasive) but also to make sure you don’t cut too little, which could create gaps.

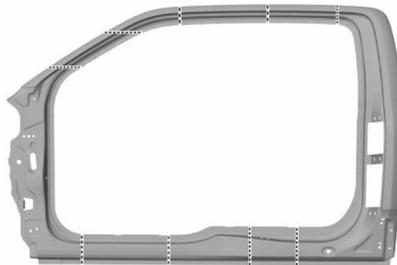
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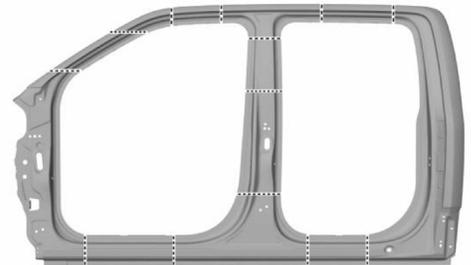
This I-CAR graphic shows the type and location of the materials used to prep the panel for repair. The Xs on the bottom of the panel note the location of two drains. Repairers should avoid getting adhesive in this area.



Regular Cab



Super Cab



Super Crew Cab

The dotted lines represent **suggested** cut-lines for sectioning procedures, as found in the official *Ford Workshop Manual*. Actual cut-lines can be determined by the repairer and the type of damage, as long as they stay 50 millimeters away from striker and hinge points.

### IN THIS ISSUE

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# ADAS Component Calibrations

The [job aids](#) on advanced driver assistance systems (ADAS) for Ford and Lincoln vehicles contain a wealth of helpful information, including the specific conditions in which an ADAS component would require calibration, which is detailed below.

When servicing or calibrating any ADAS components, the detailed procedures contained in the *Ford Workshop Manual (WSM)*—accessible through [FordServiceInfo.com](http://FordServiceInfo.com) or the Ford Professional Technician Society (PTS) site—should *always* be followed.

It is important to note that advanced driver assistance systems are intended to work on the vehicle as it is designed. *Any aftermarket alteration could cause a system to malfunction, or to not accept a correct calibration.*

*On Target* plans to include additional job aid details in future volumes. These job aids—and much more—can be found on [FordCrashParts.com](http://FordCrashParts.com).



For more information on electric vehicle repair, or ADAS calibration, contact the Ford Crash Parts Hotline at [cphelp@fordcrashparts.com](mailto:cphelp@fordcrashparts.com) and visit [I-CAR.com/ADAS](http://I-CAR.com/ADAS).

ADAS Component Description		
Component	When is Calibration Required?	Notes
360 Degree Cameras	Front Camera	<ul style="list-style-type: none"> <li>Elevation system check and azimuth system check must be performed</li> </ul>
	Rear Camera	<ul style="list-style-type: none"> <li>Elevation system check and azimuth system check must be performed</li> </ul>
	LH and RH Side Cameras	<ul style="list-style-type: none"> <li>Azimuth system check must be performed</li> </ul>
ADAS Module	<ul style="list-style-type: none"> <li>New ADAS module is installed</li> </ul>	<ul style="list-style-type: none"> <li>Programmable module installation</li> </ul>
Anti-Lock Brake System (ABS) Module	<ul style="list-style-type: none"> <li>New ABS module is installed</li> </ul>	<ul style="list-style-type: none"> <li>Programmable module installation</li> <li>ABS calibration</li> <li>Electronic parking brake (EPB) initialization</li> <li>Powertrain control module passive anti-theft system (PCM PATS) programming application</li> <li>Module initialization</li> </ul>
Head Up Display (HUD) Module	<ul style="list-style-type: none"> <li>A new HUD is installed</li> </ul>	<ul style="list-style-type: none"> <li>Programmable module installation</li> </ul>
	<ul style="list-style-type: none"> <li>The HUD is removed and reinstalled or replaced</li> <li>The instrument panel is removed and installed or replaced</li> <li>A new windshield is installed</li> </ul>	<ul style="list-style-type: none"> <li>HUD calibration</li> <li>If the system is not calibrated, the images may be distorted or display improperly.</li> </ul>
Image Processing Module A (IPMA)	<ul style="list-style-type: none"> <li>New IPMA is installed</li> </ul>	<ul style="list-style-type: none"> <li>Programmable module installation</li> <li>IPMA camera alignment</li> </ul>
Image Processing Module B (IPMB)	<ul style="list-style-type: none"> <li>New IPMB is installed</li> </ul>	<ul style="list-style-type: none"> <li>Programmable module installation</li> <li>Parking aid camera initialization</li> <li>360-degree-view camera alignment</li> </ul>
Lane Keeping Camera	<ul style="list-style-type: none"> <li>When a windshield, camera or IPMA is replaced</li> <li>If the windshield is removed for structural repairs that affect windshield position</li> <li>Change in tire size</li> <li>Suspension repair or alignment</li> <li>Front airbag deployment</li> </ul>	<ul style="list-style-type: none"> <li>IPMA camera alignment</li> <li>Lane keeping systems are developed and calibrated based on the manufacturer's specified ride height and wheel/tire combinations. If the ride height or wheels have been altered this will affect system accuracy.</li> </ul>
Side Obstacle Detection Modules	<ul style="list-style-type: none"> <li>New SODL or SODR module is installed</li> </ul>	<ul style="list-style-type: none"> <li>Programmable module installation</li> </ul>
Cruise Control Module (CCM) and Radar Sensor	<ul style="list-style-type: none"> <li>New CCM is installed</li> </ul>	<ul style="list-style-type: none"> <li>Programmable module installation</li> <li>Cruise control radar alignment</li> </ul>
	<ul style="list-style-type: none"> <li>When a vehicle has been in an accident</li> </ul>	<ul style="list-style-type: none"> <li>The radar sensor requires a vertical check and adjustment.</li> <li>After the vertical check and adjustment, a horizontal alignment procedure must be performed during the road test using the calibration routine found in the diagnostic scan tool.</li> </ul>
	<ul style="list-style-type: none"> <li>Whenever the sensor itself or the bracket support in which it is mounted is removed from the vehicle for access</li> </ul>	<ul style="list-style-type: none"> <li>The radar sensor requires calibration, consisting of a vertical mechanical adjustment followed by a horizontal alignment.</li> </ul>
Parking Assist Control Module (PAM)	<ul style="list-style-type: none"> <li>New PAM is installed</li> </ul>	<ul style="list-style-type: none"> <li>Programmable module installation</li> </ul>
Parking Aid Sensors	<ul style="list-style-type: none"> <li>Whenever a sensor is removed and reinstalled or replaced</li> </ul>	<ul style="list-style-type: none"> <li>Azimuth system check must be performed</li> </ul>
Active Park Assist Sensors	<ul style="list-style-type: none"> <li>Whenever a sensor is removed and reinstalled or replaced</li> </ul>	<ul style="list-style-type: none"> <li>Azimuth system check must be performed</li> </ul>

# Ford Maverick®: Vehicle-Specific Body Construction

On Target provides another update of vehicle-specific exterior component details on the standard, full-hybrid Ford Maverick pickup. This time, we provide a look at the cowl panel and the roof panel, including the roof opening-panel configuration.

For the previous installment, see [On Target, 2022 - Vol. 1](#).

Please note the following information is intended as a general guideline and is not all-inclusive. For more in-depth repair information on this and other Ford and Lincoln vehicles, consult the *Ford Workshop Manual*, found at [FordServiceInfo.com](#).

For more information, refer to **Section 501-26: Body Repairs – Vehicle Specific Information and Tolerance Checks, Description and Operation**

## Cowl Panel

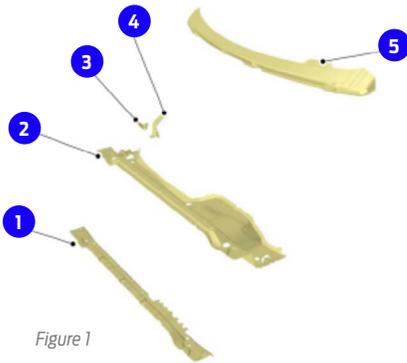


Figure 1

### Cowl Panel [Figure 1]

Item	Description	Steel Type
1	Cowl reinforcement	Mild steel
2	Cowl plenum panel	Mild steel
3	Bracket	Mild steel
4	Bracket	Mild steel
5	Upper cowl panel	Mild steel

## Roof

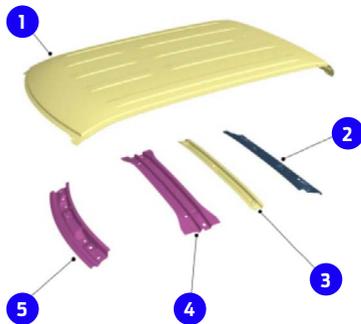


Figure 2

### Roof [Figure 2]

Item	Description	Steel Type
1	Roof panel assembly	Mild steel
2	Rear header assembly	High-strength low-alloy (HSLA) 240 steel
3	Roof bow	Mild steel
4	Roof bow	Dual-phase (DP) 800 steel
5	Windshield header assembly	Dual-phase (DP) 800 steel

## Roof (with opening panel)



Figure 3

### Roof (with opening panel) [Figure 3]

Item	Description	Steel Type
1	Roof panel assembly	Mild steel
2	Rear header assembly	High-strength low-alloy (HSLA) 240 steel
3	Roof bow	Mild steel
4	Roof opening reinforcement	Mild steel
5	Windshield header assembly	Dual-phase (DP) 800 steel

On Target plans to include more construction details on the Maverick in future volumes.

For more information on the Maverick, or any Ford or Lincoln vehicle, contact the Ford Crash Parts Hotline at [cphelp@fordcrashparts.com](mailto:cphelp@fordcrashparts.com) or visit I-CAR's RTS Portal at [RTS.i-car.com](https://RTS.i-car.com).

# Ford Provides Details on Sectioning Repair Options

*Continued from page 1*

When cutting the new panel, the video advised to cut close to the edge line you previously marked but **not** on the line itself, leaving some extra material—around a half-inch to three quarters of an inch—on the new panel for grinding and dressing up the edges. Using a grinder to remove this extra material right up to the cut line will prevent a wavy edge line gap on the panel and allows for a much more consistent gap for your welds.

Bonanni noted that while MIG-welding is the preferred method, if a technician is proficient with TIG-welding, that is allowed, leaving it to the technician's discretion and judgment.

Another important point Bonanni mentioned is to mark the rivet location and the rivet type on the panel, as this repair alone utilizes five different rivet part numbers. He also strongly recommended against using aftermarket rivets, noting they do not have the same number or type of rivets that Ford vehicles require.

Over 66 different types of rivets are used in the assembly of the F-150® and Super Duty®, and the number and type of each rivet is location-dependent. Bonanni said he has heard repairers state that “you can put any rivet you want, wherever you want,” which is absolutely wrong.

“Go to the direct source, the Ford Motor Company site [[FordServiceInfo.com](#)] and get the information for the rivets, and where their locations are, and mandrels to set them,” said Bonanni.

Taking the time to properly prepare the repair, ensuring cut lines are accurate and that everything lines up for final assembly is very important, given the limited time with the adhesive as you approach the end of the repair.

Reiterating his point to always research the repair, Bonanni noted to only use the *Ford Workshop Manual (WSM)* when repairing any Ford or Lincoln vehicle, as it provides step-by-step repair instructions. Repairers are encouraged to check the WSM often as repair procedures can be updated without notice. Aftermarket or off-brand workshop manuals may not put in corrections or updates to repairs, since they exist as a static snapshot of data, whereas the WSM is continually updated. Any revision dates will appear in the top right corner on repair procedures in the WSM.

A video library containing this and other *Repairers Realm* topics can be found at [I-CAR.com/Repairers-Realm](https://I-CAR.com/Repairers-Realm).

For more information on electric vehicles, or the repair of any Ford or Lincoln vehicle, visit [FordCrashParts.com](https://FordCrashParts.com).

# Ford Mustang® Mach-E® SUV Exterior Components

Here is some more vehicle-specific information on the Ford Mustang Mach-E SUV. This time, we look at the roof and body-side outer panels.

Please note the following information is intended as a general guideline and is not all-inclusive. For more in-depth repair information on this and other Ford and Lincoln vehicles, consult the *Ford Workshop Manual*, found at [FordServiceInfo.com](http://FordServiceInfo.com). Check back often as repair procedures can change without notice.

For more information, refer to **Section 501-26: Body Repairs – Vehicle Specific Information and Tolerance Checks, Description and Operation**

*On Target* plans to include more construction details on the Mustang Mach-E in future volumes, including some of the special tools needed for service, as found on Ford's Rotunda website.



## Roof [Figure 1]

Item	Description	Steel Type
1	Roof panel assembly	Mild steel
2	Rear header assembly	High-strength low-alloy (HSLA) 380 steel
3	Windshield header assembly	Boron steel
4	Roof opening panel frame	Dual-phase (DP) 800 steel
5	Roof bow	High-strength low-alloy (HSLA) 380 steel
6	Roof bow	High-strength low-alloy (HSLA) 380 steel

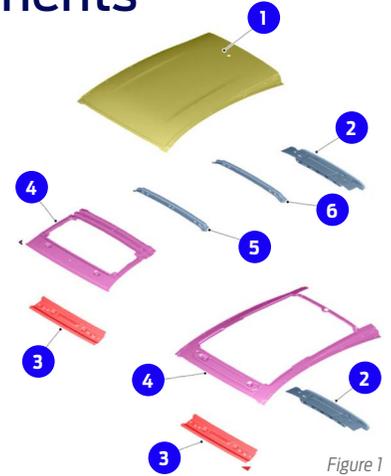


Figure 1

## Body Side Outer Panels [Figure 2]

Item	Description	Steel Type
1	Door frame	Mild steel
2	Outer quarter panel	Mild steel
3	Body side panel	Mild steel
4	Outer rocker panel	Mild steel

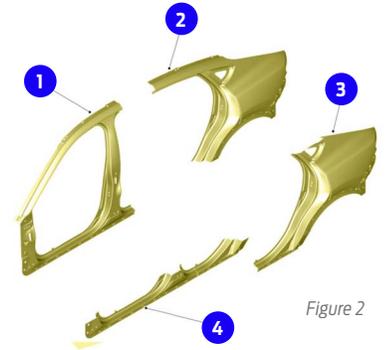


Figure 2

For more information on the Mach-E, or any Ford or Lincoln vehicle, contact the Ford Crash Parts Hotline at [cphelp@fordcrashparts.com](mailto:cphelp@fordcrashparts.com) or visit I-CAR's RTS Portal at [RTS.i-car.com](http://RTS.i-car.com).

## I-CAR® Launches New Website to Help Attract Talent to the Collision Repair Industry

I-CAR—in collaboration with the Collision Repair Education Foundation™ (CREF)—has officially launched [CollisionCareers.com](http://CollisionCareers.com), a seminal online experience dedicated to connecting individuals to rewarding opportunities in collision repair.

The site, which launched in July, is the first phase of a comprehensive strategy to position collision repair as a viable career option to job seekers, students and those influencing their decisions, such as parents or school instructors.

According to the *Techforce Foundation 2020 Technician Supply and Demand Report*, a combination of unfilled roles and expected retirements over the next five years will result in an estimated 100,000 skilled technicians leaving the industry. *CollisionCareers* will be used to help build a bridge between job seekers and students who are interested in exploring a rewarding career path in the collision repair industry.

This centralized hub at *CollisionCareers* includes:

- **Educational Resources:** Powered by I-CAR and CREF, the site empowers visitors with articles, tutorials and links to curriculums to build a foundation for collision repair knowledge and skills.
- **Community:** Collaboration and knowledge-sharing are cornerstones of I-CAR and its sister organization, CREF. [CollisionCareers.com](http://CollisionCareers.com)

fosters a vibrant community where professionals, industry experts and enthusiasts can connect, engage and garner valuable insights.

- **Extensive School and Shop Search:** Users can input their information to stay connected with *CollisionCareers* as they consider the industry and peruse listings of local Gold Class® shops and CTE schools within a state range for career or educational opportunities.

“The collision repair industry is essential in ensuring the safety of drivers by properly repairing vehicles,” said Arianna Sherlock, senior director of marketing at I-CAR. “We’re proud to be leading this initiative on behalf of the industry and look forward to attracting talented individuals who are seeking a rewarding and valuable career in collision repair.”

For more information, visit [CollisionCareers.com](http://CollisionCareers.com) and check back often as it will soon include updated curriculum for technical schools and entry-level employees, as well as additional resources.



# Ford Mustang® Mach-E® SUV Emergency Response Guide: Structural Reinforcements

Following our previous installments—which can be found [here](#) and [here](#)—*On Target* continues providing critical information from the Ford Mustang Mach-E SUV Emergency Response Guide (ERG). While the information is intended for emergency crews and first responders, it's worthwhile reading for every repairer. These details—general warnings for extraction procedures—provide an overview of structural reinforcement locations as found on the Mustang Mach-E SUV.

## Electric Vehicle (EV) Safety Notes:

- When approaching an electric vehicle in a fire, rescue or recovery situation, one industry standard rule should consistently be followed: **always assume the vehicle's high-voltage system is powered up.**
- Before accessing the vehicle, ensure that any external power supply is disconnected. Failure to follow these instructions may result in serious injury or death.
- Removing the service disconnect plug will disconnect the high voltage from the vehicle. However, **the high-voltage battery pack will remain live and dangerous.** Do not cut or penetrate the high-voltage battery case. If possible, isolate and avoid contact with high-voltage vehicle components.

- Any time the ignition is in the OFF position (and the vehicle is not being charged), or if the service disconnect plug is removed, the high-voltage system is deactivated.
- **The high-voltage system may retain a dangerous level of voltage for a short time after the high-voltage system is depowered. Wait a minimum of 5 minutes for the voltage to dissipate.** Failure to follow this instruction may result in serious injury or death.

The emergency response guide can be found on the EV/hybrid page of [FordCrashParts.com](#). This page contains information on electric and hybrid vehicles from Ford including the Escape®/Corsair®, Maverick®, Explorer®, Aviator®, F-150® Lightning® and the Mustang Mach-E.

When repairing any Ford or Lincoln vehicle, **always** consult the official *Ford Workshop Manual* (found on [FordServiceInfo.com](#)) as it provides step-by-step repair instructions. Technicians are encouraged to check back often as repair procedures can be updated without notice.

*On Target* will continue to provide important information on EVs in future volumes.

For more information on electric vehicles, or the repair of any Ford or Lincoln vehicle, visit [FordCrashParts.com](#).



Side View

Figure 1



Top View (with sunroof opening)

Figure 2



Top View (without sunroof opening)

Figure 3

Additional information on EVs can also be found on [FordServiceInfo.com](#). Under 'Free Resources,' click on 'Rescue Cards.'

## Tips and Details on the Ford F-150® Lightning®

In this installment of important collision repair and safety information for the Ford F-150 Lightning, we look at VIN layouts, as well as some helpful tips for vehicle immobilization and stabilization while lifting the vehicle.

Please note the following information is intended as a general guideline and is not all-inclusive. For more in-depth repair information on this and other Ford and Lincoln vehicles, consult the *Ford Workshop Manual*, found at [FordServiceInfo.com](#). Check back often as repair procedures can change without notice.

F-150 Lightning repairs should only be performed by technicians trained for electric vehicles and with the proper personal protective equipment to safely conduct them.

### Vehicle Identification Number (VIN) Layout

- L – BEV (Dual Electric Motor)
  - Standard (Battery #1)
- V – BEV (Dual Electric Motor)
  - Extended-Range (Battery #2)

Sample VIN: 1FT6W1EV2NWG01689

The 8th position of the VIN identifies the vehicle's engine type as electric.

### Immobilization

1. Position wheel and tire chocks. [Figure 1]
2. Put vehicle into Park position and ensure the parking brake is engaged.

### Stabilization / Lifting

When lifting the F-150 Lightning, note the circled anchor/lift-points in the diagram, and

their position next to the high-voltage battery. [Figure 2]

When researching the official *Ford Workshop Manual (WSM)*—a resource that should **always** be followed when repairing any Ford or Lincoln vehicles as it provides step-by-step repair instructions—technicians will find the information for the Lightning inside the entry for the non-electric F-150. Any repair procedure that is unique to the Lightning will include the word "Electric" after the specific section repair topic.

*On Target* will continue to provide important information on the F-150 Lightning and other Ford EVs in future volumes.

Additional information on EVs can also be found on [FordServiceInfo.com](#). Under 'Free Resources,' click on 'Rescue Cards.'

For more information on electric vehicles, or the repair of any Ford or Lincoln vehicle, visit [FordCrashParts.com](#).

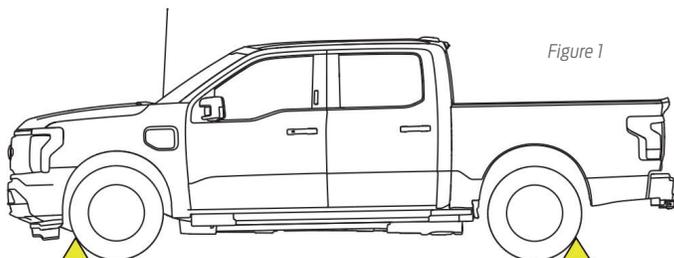


Figure 1

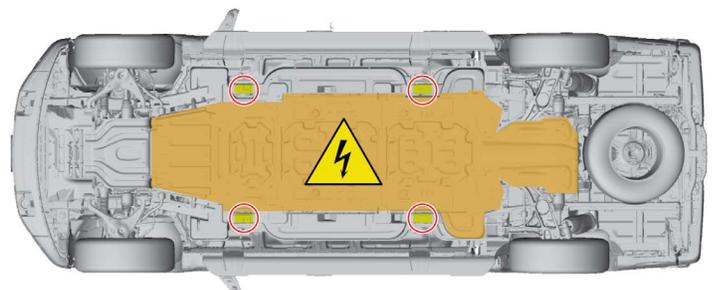


Figure 2

# The Crash Parts Corner

## DID YOU KNOW THAT...

A recent I-CAR® *Repairers Realm* video covered the importance of OEM replacement glass components, as well as the proper tools, equipment and procedures for installing them?

The video—which can also be found at [FordCrashParts.com](http://FordCrashParts.com)—was hosted by I-CAR technicians Scott VanHulle and Scott Kaboos, who welcomed glass experts from various automakers, including Tim Siterlet, Regional Sales Manager for Carlex Glass America, LLC, the manufacturer and distributor of OEM replacement glass for Ford and Lincoln vehicles.

“Glass has evolved technologically,” said Siterlet, when asked why OEM glass is such a big deal. “OEM parts are designed and engineered, manufactured and tested to the highest quality, government standards. In fact, OE parts must also meet additional federal motor vehicle safety standards. Today’s original equipment glass are performance parts for the vehicle. They enhance your driving experience, your comfort levels and can increase the safe levels of operation when combined with the advanced driver assist features.”

Siterlet noted that many, if not all, glass components are patent-protected, meaning that none of the important vehicle-specific part information—including optical quality, curvature, shape, thickness and other details—are shared with the aftermarket.

To ensure you are ordering and installing the correct Ford replacement glass, utilize the Carlex OEM replacement glass search tool, which can be found here: [carlex.com/automotive-replacement-glass](http://carlex.com/automotive-replacement-glass).

For more information on Ford/Carlex OEM glass, including job aids, official position statements, repair videos and more, visit [FordCrashParts.com/Glass](http://FordCrashParts.com/Glass).

For more information on the Ford Certified Glass Network, or to join the program, visit [Collision.Ford.com/FordCertifiedGlassNetwork](http://Collision.Ford.com/FordCertifiedGlassNetwork) or call (833) 837-7694.



## On Target

Scheduled to be published four times a year, *On Target* aims to provide Ford and Lincoln dealership parts departments and independent collision repair shops with the technical information needed to deliver efficient, high-quality repairs to Ford and Lincoln vehicle owners.

### Editors

Gerry Bonanni  
Brad Krein  
Dean Bruce

### Contributors

Chris Caris  
Travis Alber  
Steven Lubinski  
Andrea Presnell

## On Target Digital

Download *OnTarget* for free at [FordCrashParts.com](http://FordCrashParts.com), or by clicking the Ford page on [OEM1Stop.com](http://OEM1Stop.com).

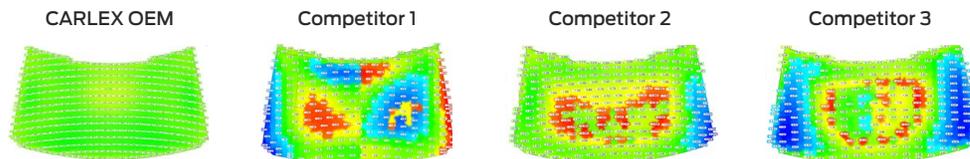
## Genuine Parting Thoughts

### Have an idea?

We’d love to hear from you. Your comments and article suggestions can be sent to:

[cphelp@fordcrashparts.com](mailto:cphelp@fordcrashparts.com)

**Carlex™** **SoundScreen®**



**Note:** Since many OEM glass components are patent-protected, the manufacturing specifics that go into their creation—including optical clarity, shape, thickness and other details—are not shared with the aftermarket. This can lead to non-OEM windshield components of wildly varying quality, as seen here: the four images show the same part number when measured against Ford OEM CAD data, which contains the specific design and manufacturing intent. **Green** represents where the windshield part exactly matches the required OEM specification. **Blue** represents a dip or valley in the glass surface, while **Red** represents a peak in the glass surface, sitting higher than the OEM specification.

