Body Repair Program
Operating Standards
Mission Statement

“To provide body shops with the training, procedures, parts, and tools to return the car to its originally-engineered state of safety, performance, and aesthetics, in an easy and economical manner.”
Section 1 Overview

1.1 Introduction

The Tesla Body Repair Program embraces the following objectives:

- **Quality**: To enable repairers to return Tesla vehicles to their originally designed state of safety, systems performance, and fit and finish aesthetics.
- **Time**: To provide repair methods and resources that shorten the time the customer is without their Tesla
- **Cost**: To make repair procedures, and the requirements to perform them correctly, affordable.

Tesla restricts the sale of certain replacement parts to repairers who possess the correct tooling and training. Restricted parts include HV (High Voltage) components and certain components that are secured with welding, structural adhesive, and/or permanent fasteners.

1.2 Operating Standards Updates

Tesla reserves the right to amend and update the Operating Standards at any time to ensure that the Body Repair Program provides the best possible level of service to our customers.

1.3 Meeting Operating Standards Requirements

Each prospective body shop is required to meet all standards within 30 days of their application acceptance. Only when they meet all the requirements of the Operating Standards, have the General Terms and Conditions for Collision Repair Services (GTC) signed, and complete Tesla Body Repair training are they entitled to order restricted parts from Tesla, participate in Tesla Body Repair Program training, and to use the title “Tesla Approved Body Shop”.

The working partnership between the Tesla Service Center and their Tesla Approved Body Shop (TABS) is of critical importance. The working partnership is defined by the GTC between Tesla and the TABS. The GTC is a legal and binding contract that ensures that the TABS complies with the Operating Standards.

Applicant body shops need to meet the following qualifications:

- Have all local, state, and federal licenses and permits, and operate in accordance with all regulations.
- Possess a Sales Tax ID Number.
- Possess a Federal Tax ID Number.
- Meet or exceed all local, state, and federal safety and environmental standards.
- Possess an EPA Number.
- Have proof of garage keeper's liability and workers' compensation insurance.
- Have current subscriptions to, and be proficient in the use of, computer based P-Page estimating systems with digital imaging and electronic estimate transfer capability.
- Demonstrate ongoing industry relevant training (certificates) for management, administration, and production personnel.
- Have the ability to hoist a vehicle for inspection.
- Have a pressurized spray booth equipped with baking capabilities and a fresh air-supplied respirator system that meets current local, state, and federal requirements.
- Have the ability to complete and verify four-wheel alignment through computer printout either from an in-house alignment system or a qualified sublet service with same-day service.
- Offer a written limited lifetime warranty against defects in workmanship.
- Have the ability to remove and reinstall suspension, engine, drivetrain, and cooling components in house.
- Have the ability to evacuate, reclaim, and recharge vehicle air conditioning systems using EPA compliant in-house equipment and certified technicians.
• Utilize Tesla “Toolbox” software as necessary to complete required Toolbox work in house.
• Provide proper safety equipment and work environment for all employees.
• Have a documented on-going system for measuring, tracking, and reporting customer satisfaction.

1.4 Repair Procedures Requirements

TABSs must follow the requirements for repair procedures, as well as have available all of the required tools outlined in the Tesla equipment list.

• There is NO pulling allowed on Tesla aluminum structure vehicles. Structural repairs require the use of a frame bench system with specific measuring and dedicated fixtures, with the exception of the structural repairs listed in Appendix 1 (BR-16-10-008, “Structural Repair Procedures Not Requiring a Frame Bench”). Refer to Appendix 2 (BR-14-10-004, “Model S and Model X Structural Repairs”), and Appendix 3 (BR-16-92-006, “Approved Frame Bench Systems”) for more information.
• TABS are required to maintain separate hand tools for use on aluminum, which are not to be used on steel.

Tesla’s intent is to facilitate affordable compliance with the mandates required to properly repair its vehicles. For this reason, Tesla negotiates with equipment manufacturers to provide equipment directly to TABS, at the lowest price negotiable, with no margin for Tesla.

1.5 Operating Standards Compliance and Audits

Tesla reviews the approval status of a body shop from time to time by a physical review of the TABS facilities by Tesla, or by a representative appointed by Tesla.

1.6 The Approval Process

The steps below are an overview of the TABS application and approval process. A flowchart of the process also appears below.

• Submit a completed Tesla Authorized Body Shop onboarding questionnaire (found on the landing page of the TABS website)
• Once contacted by Tesla onboarding team:
  o Sign and return the Non-Disclosure Agreement
  o Sign and return the GTC
  o Pay for required training
  o Purchase required Tesla tooling
  o Complete Tesla training
  o Pass a site validation demonstrating ownership of all required tooling and equipment listed in the Tesla tooling list
  o Receive Electronic Parts Catalog access
  o Begin having work referred from Tesla

1.7 Training Requirements

Each TABS is required to meet the Tesla training requirements to perform structural and non-structural repair work on Tesla vehicles. Only technicians at a TABS who possess a current and valid certificate for Tesla aluminum welding and/or structural repair may perform those types of repair work on Tesla vehicles.
1.8 Training Course Requirements

- Primary Structural Location: 2 fully-trained technicians
  - Welding certification:
  - Model S and X Structural Repair
  - Mechanical, Electrical, Trim

- Satellite Cosmetic Repair Locations: All technicians working on Tesla vehicles
  - 1 hour online EV safety course
Section 2  Program Terms and Working Relationship with Tesla

Tesla Approved Body Shops are required to meet and adhere to the Tesla Body Repair Program Operating Standards including all current, referenced Body Repair documents such as, but not limited to, training and tooling requirements.

2.1  Program Terms

All TABS will be reviewed on the following performance criteria:

- **Quality – Vehicle repair and customer experience**
  - Customer survey (96% CSI minimum required):
    - Did it look good?
    - Did everything work properly?
    - Was it done on first target date given?
    - Did customer have to return or re-visit repair for any reason?
    - Did customer have to contact shop for information or were updates pushed to customer at satisfactory intervals?

- **Time (9 day cycle time average required)**
  - Keys to keys
  - Backlog of 1 week or less (wait to get in)
  - Number of parts orders – maximum of 2 per Repair Order
  - Timing of parts orders (ordered at the beginning, or in the middle and/or at the end?)

- **Cost**
  - Customer survey
  - Competitive rates
  - Insurer feedback

TABS ratings (1 to 5 Stars) are published on the TABS network locator. The rating is comprised of CSI, NPS score, cycle time, and other considerations important to the customer. Tesla will refer work to TABS based upon rating (highest first).

2.2  Parts Discount

TABSs receive a discount of 30% off of the recommended retail price for all parts ordered through Tesla. This policy is subject to change without notice.

No pricing of parts above the recommended retail price is allowed.

The parts discount and referral of work will be suspended for locations in violation of training requirements until qualifications are met.

2.3  Warranty Rate and Procedure for Tesla Paid Work

The labor rate for all TABS Tesla paid work for body, paint, structural, and mechanical work is set forth in the GTC addendum between Tesla and the body shop.

All Tesla paid work MUST be accompanied by a TABS Purchase Order (PO) completed by the Tesla Service Center, and delivered to the TABS before or with the vehicle requiring repair. TABS should not accept vehicles for repair without a completely filled out PO. Tesla will not reimburse TABS for any repair work if final billing is not accompanied by the completely filled out PO attached at time of upload.
Section 3 Facility Requirements

The proposed TABS must provide details about and photos of their facilities, as part of the online application.

3.1 Location

Primary and Satellite location:

- Multi Shop Owners (MSOs) who own a TABS may apply for approval to add additional locations as satellite location TABS, as long as they already have a primary location which is authorized for structural repairs and in good standing.
- A Tesla customer must be allowed to drop their vehicle at any location belonging to the MSO.
- Multi Shop Owners must move vehicles requiring replacement of restricted parts to their primary location at no inconvenience or cost to the vehicle owner.
- Multi Shop Owners may repair Teslas at any of their locations as long as the following conditions are met:
  - Location’s Performance Metrics (KPI’s) meet or exceed Tesla requirements.
  - Location meets facility and equipment requirements for the type of work (structural or cosmetic) being performed.
  - All terms of the GTC and these Operating Standards are met and in good standing.
  - Technicians must meet the appropriate levels of Tesla training and authorization (be in good standing) to perform any work involving restricted parts (documentation signed by tech performing restricted repairs required to be kept permanently on file and available upon Tesla’s request).

3.2 Exterior

- The exterior surfaces of the TABS building structure, cladding, fascia, etc. must present a well-maintained, presentable image.
- The TABS must have a securely-fenced parking area.

3.3 Signage

Tesla supplies signs only after the proposed TABS has performed the full audit and has successfully passed the initial audits.

3.4 Parking and Vehicle Security

- The customer parking spaces must be clearly designated and well-lit.
- Parking and storage of damaged vehicles must be concealed from visitors and customers.
- Vehicles must be stored at the TABS in a manner that prevents further damage (e.g. water ingress, vandalism, theft, etc.).

3.5 Customer Reception

- An area must be designated for customer reception and this area must be kept clean and neat.
- The business hours of the TABS must be clearly displayed in the reception area and on the exterior of the building.
- Customer-only restrooms segregated from staff facilities must be available and accessible from the reception area.
3.6 Workshop

The workshop area must contain the following dedicated areas:

- Estimating/blueprinting/Repair Planning area
- Aluminum repair area (curtain acceptable)
- Paint mixing room
- Paint booth
- Detailing and car cleaning area

3.7 Access

Insurance appraisers must be permitted unrestricted access to Tesla vehicles, parts, and any Tesla published repair procedures and documentation upon request, so that the approval portion of the repair cycle time is minimized.

3.8 Paint Booth Specifications

The TABS must have at least one downdraft paint booth capable of bake operations. The paint booth must meet all state, local, and federal regulations.
Section 4 Communication and Information Technology

TABS are required to provide repair status data to Tesla via tracking software of Tesla's choosing. Thorough and accurate reporting of required information and status is an absolute requirement for Tesla Body Repair Program participation.

4.1 Internet

The TABS facility must have high-speed Internet w/ wifi. Workshop staff must have access to the Tesla Body Repair information provided via the internet on a computer with wifi access which can be used at vehicles undergoing repair.
Section 5  Equipment and Consumables Specifications

5.1  Paint Systems

Refer to Appendix 4 (BR-14-10-009, "Paint Systems That Meet Tesla Warranty Requirements") for a list of paint systems that meet the warranty level required of TABS.

5.2  Approved Adhesives

Only the adhesives specified in Appendix 5 (BR-15-92-008, “Approved Structural Adhesives”), are to be used for the structural repair of Tesla vehicles.

5.2.1  Approved Adhesive System for Composite Repairs

The approved adhesive system for Roadster bonded body panels is specified by the Body Repair Manual procedures.

5.3  Approved Tooling

For a current listing of required tools and equipment, refer to the TABS tooling requirements.
Section 6 Quality Program Procedures and Best Practices

In order to minimize parts orders, streamline insurer approval, eliminate unwanted discovery of hidden damage during repair, and minimize repair cycle time, All TABS are required to “Repair Plan” (blueprint) Tesla vehicles, rather than just de-trimming and disassembling as repairs progress.

TABS are required to:

- Dismantle vehicle completely up front to expose all primary and secondary accident damage, as well as anything that will break during disassembly.
  - Remove every part, nut, bolt, fastener, clip, piece of trim, glass etc. so that no parts are discovered and ordered during downstream dismantle, that could be exposed by taking all apart up front.
  - Includes cutting open layered regions (quarter panels, pillars, etc.), if not repairable, to expose hidden damage, so internal parts can all be ordered up front.
- Read all repair procedures to make sure any prerequisite parts and consumables are also ordered for structural repairs.
- Maintain permanent, physical documentation signed off by a properly trained technician who performed any restricted parts replacement.
- Store parts on a parts cart. DO NOT store parts in the car.
- Attempt to repair aluminum exterior panel and bumper cover cosmetic damage to reduce parts needed, and the associated time and complications that accompany them (wrong parts, damaged parts, parts delays, etc). Labor is “in stock”.

Insurance approval is greatly streamlined when:

- Repair attempts are already done (variability of “will it fix” is eliminated).
- All parts needing replacement are off of the car, clearly visible as to why they need to be replaced (instead of arguing about what “might” happen if not already taken apart).
- Tesla repair documentation has been reviewed and is available to share with insurance inspector should questions arise as to why certain operations are necessary.
  - Tesla Service and Body Repair documentation must be shared with insurance company if requested.

TABS assumes full responsibility for any defects or consequences resulting from repair workmanship.

6.1 Care of Customers Vehicles

All vehicles undergoing repairs must be protected with the following:

- Seat covers
- Steering wheel protection
- Floor mats
- Car covers
- Glass protection paper when welding or grinding

6.2 Remote Access Disable

Upon receipt of vehicle, TABS should disable remote access to prevent undesired system functions from occurring via the customer’s phone app. Place a “Remote Access Disabled” Card on the Dash. Refer to Appendix 6 (BR-16-00-004, “Disable Remote Access When the Vehicle is at the Body Shop”) for more information.
6.3 Communications Log

Each TABS must maintain a communications log of all communication with the customer in their Body Shop Management System. This information must be complete, and accurately date and time stamped. The documentation of customer correspondence must be shared with Tesla when requested.
Section 7  Ordering Parts

Parts should be ordered immediately after liability is accepted and customer submits photos, or an estimate is written, so that repairs can start as quickly as possible. Tesla provides free 72 hour returns for any parts not needed.

All parts are ordered through the Electronic Parts Catalog (EPC) (https://epc.teslamotors.com/). Enter the VIN accurately to drive options and supersession logic.

7.1 Tesla Paid Work

For warranty or any other work where Tesla is paying for the parts, TAB will order parts through the EPC, including the normal 30% discount from Tesla. TABS will re-bill those parts back to Tesla at a 20% discount, realizing a 10% margin on parts to cover handling costs.

The TABS must notify Tesla within 72 hours of delivery about any parts that arrive damaged, incorrect, or missing from Packing Slip or Invoice.

7.2 Past Due Invoices

Any TABS that is not current on their invoice payments (any invoices over 30 days past due) will not receive additional parts orders until invoice payments are made current.

7.3 Work In Progress

Update vehicle status daily in the Tesla-required vehicle tracking tool.

Proactively updating Tesla customers every 3 days or less is a mandate of the Tesla Approved Body Shop Program. Customer feedback indicating they had to manage the repair will be grounds for removal from the Tesla Body Repair Program.

7.4 Supplemental Damage

TABS are required to Repair Plan (blueprint) all Tesla vehicles in order to eliminate supplements.

The number of parts orders is scrutinized by Tesla. No more than 2 orders per vehicle are acceptable (1st order from photos or initial estimate, 2nd and final order after Repair Planning (Blueprinting) is complete).

7.5 Final Quality Control

The TABS manager is required to visually and functionally check every line of the final bill against the finished vehicle before calling the customer (this is a functional test, not a glance at the car in the parking lot):

- Verify all trim fits symmetrically side to side, and is fastened tightly.
- Verify all functions that might be affected by any components replaced or removed and reinstalled function correctly by physically testing.
- Door handles, windows, wipers, HVAC, keyfob and proximity functions, etc.
- Test drive if vehicle had structural repairs, suspension repairs, wheel alignment, or any operations touching parts utilized by AutoPilot. Refer to Appendix 7 (BR-16-00-003, “Calibrating the Driver Assistance System”).
- Re-enable Remote Access when final quality control is complete and remove the “Remote Access Disabled” card. Refer to Appendix 6 (BR-16-10-004, “Disable Remote Access When the Vehicle is at the Body Shop”) for more information.
TABS are required to charge customer vehicles to customer-specified State of Charge (SOC) before pickup.

I, ___________________________ (agent), with appropriate credentials to bind ________________________________ (Company Legal Name) to the terms and conditions of these operating standards, fully understand and guarantee compliance to each of the requirements set forth above.

Signed:

X______________________________ Title _________________________ Date_____________
Body Repair Tech Note: Structural Repair Procedures Not Requiring a Frame Bench

Body Repair Tech Notes provide information about Tesla-approved methods and practices for body repair. These instructions assume knowledge of motor vehicle and high voltage electrical component repairs, and should only be executed by trained professionals. Tesla Motors assumes no liability for injury or property damage due to a failure to properly follow these instructions or for repairs attempted by unqualified individuals.

All structural repairs must be performed with the vehicle properly mounted to an approved frame bench, with the exception of the following procedures:

NOTE: For a list of approved frame bench systems, refer to BR-16-92-006, "Approved Frame Bench Systems".

NOTE: A frame bench should be used as a holding fixture only. For more information, refer to BR-14-10-004, "Model S and Model X Structural Repairs".

NOTE: The only approved method for evaluating structural damage and for performing structural repair is to use a minimum of 8 fixture points on an approved frame bench. More fixture points might be necessary depending on the level of damage. For more information, refer to BR-14-10-004, "Model S and Model X Structural Repairs".

Model S

- Body Side Outer (Lower Section)
- Front Frame Rail Cap (Rear Wheel Drive)
- Front Header Assembly
  
  NOTE: The front and rear suspension must be unloaded while the Front Header Assembly procedure is performed.

- Front Shock Tower Reinforcement
- Quarter Outer Skin (Complete)
- Rear Header Assembly
  
  NOTE: The front and rear suspension must be unloaded while the Rear Header Assembly procedure is performed.

- Rear Trunk Floor Panel Extension
- Rear Node Reinforcement
- Rear Trunk Floor Assembly
- Shotgun Upper Assembly (Section)
  
  NOTE: The front suspension must be unloaded while the Shotgun Upper Assembly (Section) procedure is performed.

- Wheel Arch Outer Panel (Section)
- Wheelhouse Extension Panel
Model X

- A-Pillar Upper Outer (Complete)
- A-Pillar Upper Outer (Section)
- Body Side Outer (Lower Section)
- B-Pillar Header Upper
- Rear Node Outer Reinforcement
- Rear Quarter Outer

**NOTE:** If the lower half of the rear door is removed or if the spine is supported during the repair, the Rear Quarter Outer procedure can be performed without mounting the vehicle to an approved frame bench. Otherwise, the vehicle must be mounted to an approved frame bench.

- Rear Trunk Floor Panel
- Rear Trunk Waterfall
- Rear Wheel Arch (Complete)
- Rear Wheel Arch (Section)
- Rear Trunk Floor Panel Extension
- Wheelhouse Extension Panel

For feedback on the accuracy of this document, email collision-techinfo@tesla.com.
Body Repair Tech Note: Model S and Model X Structural Repairs

Body Repair Tech Notes provide information about Tesla-approved methods and practices for body repair. These instructions assume knowledge of motor vehicle and high voltage electricity repairs, and should only be executed by trained professionals. Tesla Motors assumes no liability for injury or property damage due to a failure to properly follow these instructions or for repairs attempted by unqualified individuals.

This Body Repair Tech Note supersedes BR-14-10-004 R4, dated 06-Jun-16. Each content change is marked by a vertical line in the left margin. Discard the previous version and replace it with this one.

Structural Pulling Not Allowed

Tesla does not allow pulling on any structural component of Model S or Model X. Tesla defines a structural component as any part that is welded, weld-bonded, rivet-bonded, or riveted to the vehicle.

Pulling the body structure can damage the adhesive bond between structural components, including adhesive in seemingly unrelated parts of the body structure. Because compromised adhesive bonds significantly reduce the structural integrity of the vehicle, Tesla does not allow pulling of the body structure.

Used, Recycled, or Aftermarket Structural Parts Not Allowed

Tesla does not allow used, recycled, or aftermarket parts or components to be used for structural repairs. Structural repairs are defined as repairs involving any part or component that is welded, weld-bonded, bonded, rivet-bonded, or riveted to the vehicle.

The Model S and Model X body structures are assembled with structural adhesive at the factory, so structural parts cannot be removed without causing permanent damage to the parts themselves. There are no approved field testing methods to verify that the integrity of a part has not been compromised. To ensure that vehicle safety is not compromised after structural repairs have been performed, only new, undamaged, OEM parts should be used in conjunction with approved repair methods.

Tesla only sells parts that have been tested for safety; Tesla does not test aftermarket parts. Because Tesla cannot confirm that aftermarket structural parts will not adversely affect vehicle safety, Tesla does not allow the use of aftermarket parts in structural repairs.

For more information, refer to BR-16-02-002, "Repair Guidelines for Parts, Fasteners, and Structural Adhesives".
Performing Structural Repairs on a Frame Bench

All structural repairs on Tesla vehicles must be performed with the vehicle properly mounted to an approved frame bench, with the exception of the procedures listed in BR-16-10-008, “Structural Repair Procedures Not Requiring a Frame Bench”.

For a list of approved frame bench systems, refer to BR-16-92-006, “Approved Frame Bench Systems”.

Use Only Approved Structural Adhesives

Use only the structural adhesives listed in BR-15-92-0018, “Approved Structural Adhesives” for structural repairs on Tesla vehicles.

⚠️ **WARNING:** Do not use a non-approved structural adhesive for a Model S or Model X structural repair. Using a non-approved structural adhesive might compromise vehicle crash integrity.

⚠️ **WARNING:** Never use expired structural adhesive. Always check the expiration date on the structural adhesive before use. Using expired structural adhesive might compromise vehicle crash integrity.

⚠️ **WARNING:** Do not use structural adhesive as a substitute for welds, rivets, or any other fastening method listed in the Model S or Model X Body Repair Manual. Apply structural adhesive only to the areas shown in the relevant Body Repair Manual procedure. Substituting structural adhesive for other fasteners or fastening methods might compromise vehicle crash integrity.

Use Only Approved Fasteners

Use only the fasteners listed in BR-16-92-001, “Approved Fasteners for Structural Repair” for structural repairs on Tesla vehicles.

⚠️ **WARNING:** Use only approved fasteners sourced from Tesla when performing structural repairs on Tesla vehicles. Using non-approved fasteners might compromise the integrity of the repair and vehicle safety. Using non-approved fasteners might also affect whether Tesla supports the vehicle.

Use Only Approved MIG Welders

Use only the MIG welders listed in BR-16-92-007, “Approved MIG Welders” for structural repairs on Tesla vehicles.

⚠️ **WARNING:** Use only approved MIG welders when performing structural repairs on Tesla vehicles. Using non-approved MIG welders might compromise the integrity of the repair and vehicle safety.

Use Only Approved MIG Welding Wire

Use only the welding wire listed in BR-15-92-010, “Approved MIG Welding Wire for Structural Repairs” for structural repairs on Tesla vehicles.

⚠️ **WARNING:** Do not use non-approved welding wire for a Model S or Model X structural repair. Using a non-approved welding wire might compromise vehicle crash integrity.

For feedback on the accuracy of this document, email collision-techinfo@tesla.com.
Body Repair Tech Note: Approved Frame Bench Systems

Body Repair Tech Notes provide information about Tesla-approved methods and practices for body repair. These instructions assume knowledge of motor vehicle and high voltage electrical component repairs, and should only be executed by trained professionals. Tesla Motors assumes no liability for injury or property damage due to a failure to properly follow these instructions or for repairs attempted by unqualified individuals.

The following approved frame bench system companies work closely with the Tesla Body Repair Program to design and build fixtures to Tesla’s exact specifications. This collaboration not only provides accurate component location, but also ensures safe and proper support of the body structure during the repair process.

NOTE: All structural repairs on Tesla vehicles must be performed with the vehicle properly mounted to an approved frame bench, with the exception of the procedures listed in BR-16-10-008, “Structural Repair Procedures Not Requiring a Frame Bench”.

The following frame bench repair systems are approved for Model S and Model X structural repairs:

Car Bench
- Muraena repair benches
- Universal jig system
- Dedicated mini jigs for Model S and Model X (supplied by Tesla)
- Contact electronic measuring system (optional)

Car-O-Liner
- BenchRack alignment bench
- Quick 42 alignment bench
- Car-O-Tronic Vision X3 electronic measuring system
- EVO 1 basic anchoring system
- EVO 2 extended anchoring system
- EVO 3 holding and fixtures system
- Mounting fixtures for Model S and Model X (supplied by Tesla)

Celette
- Sevenne bench system
- Upper and lower body fixtures for Model S and Model X (supplied by Tesla)

Globaljig
- 5.0 Super Rotax, 6.0 Super Rotax, and 5.0 Mobile System
- Universal Fixture System
- Dedicated Mini Fixtures for Model S and Model X (supplied by Tesla)

Frame bench data sheets can be found on the Tesla Service website.
Body Repair Tech Note: Paint Systems That Meet Tesla Warranty Requirements

Body Repair Tech Notes provide information about Tesla-approved methods and practices for body repair. These instructions assume knowledge of motor vehicle and high voltage electrical component repairs, and should only be executed by trained professionals. Tesla assumes no liability for injury or property damage due to a failure to properly follow these instructions or for repairs attempted by unqualified individuals.

This Body Repair Tech Note supersedes BR-14-10-009, dated 17-Nov-14. Each content change is marked by a vertical line in the left margin. Discard the previous version and replace it with this one.

Paint systems from the manufacturers listed below are recognized as meeting the warranty level required for Tesla Approved Body Shops:

- BASF
- Axalta Coating Systems
- PPG
- Akzo Nobel
- Sherwin-Williams

For feedback on the accuracy of this document, email collision-techinfo@tesla.com
Body Repair Tech Note: Approved Structural Adhesives

Body Repair Tech Notes provide information about Tesla-approved methods and practices for body repair. These instructions assume knowledge of motor vehicle and high voltage electrical component repairs, and should only be executed by trained professionals. Tesla Motors assumes no liability for injury or property damage due to a failure to properly follow these instructions or for repairs attempted by unqualified individuals.

This Body Repair Tech Note supersedes BR-15-92-008 R1, dated 25-Apr-16. Each content change is marked by a vertical line in the left margin. Discard the previous version and replace it with this one.

The following structural adhesives are approved for Model S and Model X structural repairs:

NOTE: Any of the structural adhesives listed can be ordered from Tesla or sourced locally.

<table>
<thead>
<tr>
<th>Structural Adhesive</th>
<th>Tesla Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fusor 2098 Structural Adhesive</td>
<td>1062697-00-A</td>
</tr>
<tr>
<td>3M Scotch-Weld EC-9323 B/A (4:1 by volume)</td>
<td>1017751-00-A</td>
</tr>
<tr>
<td>3M Impact Resistant Structural Adhesive 07333</td>
<td>1088634-00-A</td>
</tr>
</tbody>
</table>

NOTE: These part numbers were current at the time of publication. Use the revisions listed or later, unless otherwise specified in the Parts Manual.

Any of the structural adhesives listed can be used in any Model S or Model X Body Repair Manual procedure that calls for structural adhesive, even if that structural adhesive is not specifically listed in the procedure.

⚠️ WARNING: Do not use a non-approved structural adhesive for a Model S or Model X structural repair.

⚠️ WARNING: Never use expired structural adhesive. Always check the expiration date on the structural adhesive before using.

⚠️ WARNING: Do not use structural adhesive as a substitute for welds, rivets, or any other fastening method listed in the Model S or Model X Body Repair Manual. Apply structural adhesive only to the areas shown in the relevant Body Repair Manual procedure.

For feedback on the accuracy of this document, email collision-techinfo@tesla.com
Body Repair Tech Note: Disable Remote Access When The Vehicle Is At The Body Shop

Body Repair Tech Notes provide information about Tesla-approved methods and practices for body repair. These instructions assume knowledge of motor vehicle and high voltage electrical component repairs, and should only be executed by trained professionals. Tesla Motors assumes no liability for injury or property damage due to a failure to properly follow these instructions or for repairs attempted by unqualified individuals.

Tesla vehicles are equipped with remote access that allows customers to perform vehicle functions remotely via a mobile application. Disable remote access when the vehicle is at the body shop to prevent remote activation of features that might cause the vehicle to behave unexpectedly.


NOTE: Turn Remote Access on before returning the vehicle to a customer.

For feedback on the accuracy of this document, email collision-techinfo@tesla.com.
Body Repair Tech Note: Calibrating the Driver Assistance System

Body Repair Tech Notes provide information about Tesla-approved methods and practices for body repair. These instructions assume knowledge of motor vehicle and high voltage electrical component repairs, and should only be executed by trained professionals. Tesla assumes no liability for injury or property damage due to a failure to properly follow these instructions or for repairs attempted by unqualified individuals.

This Body Repair Tech Note supersedes BR-16-00-003 R1, dated 09-Sep-16. Each content change is marked by a vertical line in the left margin. Discard the previous version and replace it with this one.

The Driver Assistance System

Model S built between September 2014 and October 12, 2016 and Model X built before October 12, 2016 are equipped with driver assistance components, which enable 1st generation Autopilot. The Driver Assistance System (DAS) includes:

- A forward facing radar sensor with a built-in Electronic Control Unit (ECU)
- A forward facing camera with 1 lens and built in ECU mounted on the windshield
- 12 ultrasonic sensors (6 mounted to the front fascia and 6 mounted to the rear fascia)
- An electromechanical brake booster
- A Park Assist ECU
- Software

Vehicles built after October 12, 2016 have additional Driver Assistance System components, which enable 2nd generation Autopilot:

- A forward-facing camera with 3 lenses mounted on the windshield
- 2 side forward-facing cameras mounted inside of the B-pillar (one on the left-hand side of the vehicle, and one on the right-hand side of the vehicle)
- 2 side rear-facing cameras mounted inside of the side repeaters (one on the left-hand side of the vehicle, and one on the right-hand side of the vehicle)
- A rear-facing camera located in the liftgate area
- An Autopilot ECU located behind the glovebox

The hardware interfaces with the software to provide the driver with features like Autosteer, Autopark, Forward Collision Warning, Side Collision Warning, Auto High Beams, Summon, Parking Space Detection, Traffic-Aware Cruise Control, and Automatic Emergency Braking.

**NOTE:** The specific Autopilot features depend on what the customer has purchased.

Vehicles built on October 12, 2016 or later might be referred to as "2nd Generation Autopilot" or "DAS 2.0." Vehicles built before October 12, 2016 cannot be upgraded to include the new Driver Assistance hardware.

Calibrate the hardware after performing certain common workshop procedures to make sure that the Driver Assistance System performs properly.
Identifying 2nd Generation Autopilot Vehicles

Vehicles built after October 12, 2016 have additional Driver Assistance System components, which enable 2nd generation Autopilot:

- A forward-facing camera with 3 lenses mounted on the windshield (Figure 1)
- 2 side forward-facing cameras mounted inside of the B-pillars (Figure 2)
- 2 side rear-facing cameras mounted inside of the side repeaters (Figure 3)
- A rear-facing camera located in the liftgate area
- An Autopilot ECU located behind the glovebox (Figure 4)
When to Perform a Four Wheel Alignment

Perform a four wheel alignment whenever there is suspected damage to the suspension system, the structural components the suspension attaches to, and/or the vehicle tracks incorrectly.

NOTE: To perform a four wheel alignment, refer to Service Manual Procedure 31000100.

⚠️ WARNING Make sure that the wheels are aligned before performing a radar calibration. Performing a radar calibration on a vehicle that does not have proper wheel alignment causes incorrect radar calibration, and may result in incorrect Driver Assistance performance.

When to Perform a Forward-Facing Camera Calibration – 1st Generation Autopilot Vehicles

Perform a forward-facing calibration whenever the forward-facing camera or any component that contacts it is physically adjusted or removed from the vehicle.

NOTE: To perform a forward-facing camera calibration on a vehicle with 1st Generation Autopilot, refer to Service Manual Procedure 17230800.

When to Perform a Forward-Facing Camera Calibration – 2nd Generation Autopilot Vehicles

Perform a forward-facing camera pre-calibration whenever the camera or any component that contacts it is physically adjusted or removed from the vehicle.

NOTE: To perform a forward-facing camera calibration on a vehicle with 2nd Generation Autopilot, refer to Service Manual Procedure 17230800.

NOTE: If the forward-facing camera does not calibrate after 2 attempts, the pitch angle might be out of specification. Refer to Service Bulletin SB-17-17-002, “Adjust Camera Pitch, 2nd Generation Autopilot” for more information about adjusting the forward-facing camera pitch angle.

When to Perform a B-Pillar and Side Repeater Calibration – 2nd Generation Autopilot Vehicles

Calibration for the cameras located in the B-pillars and the side repeaters is not currently available for body shops.

Perform a functional check of the cameras located inside the B-pillars and the side repeaters whenever the camera or any component that contacts it is physically adjusted or removed from the vehicle.

To perform the functional check, run the DAS2 Image Viewer panel in Toolbox.
When to Perform a Radar Calibration

Perform a radar calibration whenever the radar sensor, or any component that contacts it, is physically adjusted or removed from the vehicle.

Model S built before April 10, 2016 (Figure 5): Perform a radar calibration after reinstallation of a front fascia.

NOTE: Do not calibrate the radar sensor if the wheels are not properly aligned.

NOTE: To perform a radar calibration, refer to Service Manual Procedure 17201500.

Figure 5 (Model S built before April 10, 2016 with the radar sensor highlighted in red)

Figure 6 (Model S built after April 10, 2016 with the radar sensor highlighted in red)  Figure 7 (Model X with the radar sensor highlighted in red)

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