



# **SURFACE VEHICLE RECOMMENDED PRACTICE**

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## New-Vehicle Collision Repair Information

## RATIONALE

This document was revised to specify the latest repair information, based on materials and methods developed during the past five years. Additions also include repair procedures and safety precautions applicable to hybrid and electrically powered vehicles.

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## 1. SCOPE

This SAE Recommended Practice defines the various types of information required by the collision repair industry to properly restore light-duty, highway vehicles to their pre-accident condition. Procedures and specifications are defined for damage-related repairs to body, mechanical, electrical, steering, suspension, and safety systems. The distribution method and publication timeliness are also considered.

### 1.1 Purpose

The purpose of this document is to assist vehicle and equipment manufacturers, and information providers in providing timely information, in user-friendly formats, to facilitate economical, high-quality repair of collision-damaged, light-duty, highway vehicles by dealer-owned and independently owned collision repair shops.

## 2. REFERENCES

### 2.1 Applicable Document

The following publication forms a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

#### 2.1.1 SAE Publication

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), [www.sae.org](http://www.sae.org).

SAE J1828 Uniform Reference and Dimensional Guidelines for Collision Repair

### 2.2 Related Publications

The following publications are provided for information purposes only and are not a required part of this SAE Technical Report.

#### 2.2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), [www.sae.org](http://www.sae.org).

SAE J1142 Towability Design Criteria and Equipment Use—Passenger Cars, Vans, and Light-Duty Trucks

SAE J1344 Marking of Plastic Parts

SAE J1555 Recommended Practice for Optimizing Automobile Damageability and Repairability

SAE J1556 Stationary Safety Glazing Replacement

SAE J2184 Vehicle Lift Points for Service Garage Lifting

SAE J2235 Paint and Trim Code Location

SAE J2621 Qualifying Aftermarket Two-Component Structural Foams

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## 2.2.2 Uniform Procedures for Collision Repair

Available from I-CAR International, 5125 Trillium Blvd., Hoffman Estates, IL 60192, Tel: 847-590-1198, <http://www.i-car.com>.

## 2.2.3 Tech-Cor Research Bulletins

Available from Tech-Cor, Applied Research, 110 E. Palatine Road, Wheeling, IL 60090, <http://www.tech-cor.net>.

## 2.2.4 Research Council for Automotive Repairs (RCAR) Design Guide

Available on the RCAR web site (<http://www.rcar.org/Papers/Papers.htm>) as a downloadable .pdf file.

## 3. DEFINITIONS

### 3.1 DRIVE-AWAY TIME

The minimum time required for an adhesive system to reach the vehicle maker's specified strength following replacement of a glass part.

### 3.2 STRUCTURAL PARTS

Parts that support vehicle weight and absorb road shock, while maintaining the vehicle shape. Structural parts also absorb and manage collision energy.

### 3.3 TRACKING OFFSET

The separation between the track of the rear wheels and the track of the front wheels of a vehicle, with zero thrust angle, as it travels in a straight line.

## 4. PUBLICATION REQUIREMENTS

### 4.1 Delivery Format

Collision repair information can be published in print form, such as repair manuals, technical service bulletins (field bulletins), towing manuals, etc., but the use of electronic formats, such as DVDs and the Internet, is encouraged. Coined or other permanent symbols, applied to specific parts, may be used if referenced in repair instructions.

### 4.2 Timeliness

To be most effective, collision repair information should be made available, to all repair facilities who request it, no later than the introduction date of each new vehicle platform. Information should be updated on a timely basis, whenever significant changes occur in areas such as procedures, specifications, prices, etc.

### 4.3 Content Level

The contents should describe the necessary vehicle-specific repair processes and specifications that will enable trained, experienced repair technicians to restore the vehicle to its pre-accident condition. Common repair practices should not be included. Descriptions of new or unique designs, materials, tools, processes, fasteners, and hazardous materials must be included, as well as unusual safety hazards.

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#### 4.4 Industry Segments

The affected industry segments include vehicle manufacturers, repair facilities, insurers, information providers, training organizations, and manufacturers of products and equipment in the following areas:

- a. Body repair
- b. Refinishing
- c. Structural parts straightening and replacement
- d. Wheel alignment
- e. Mechanical and electrical repairs
- f. Hydraulic repair

### 5. TECHNICAL CONTENTS

#### 5.1 Safety Precautions

Include special warnings and procedures, related to the vehicle repair, to avoid personal injury and property damage. It is not necessary to include standard industrial safety practices.

##### 5.1.1 Personal Protection

Safety equipment and precautions.

##### 5.1.2 Hazardous Materials (including high-voltage battery packs for hybrid and electrically powered vehicles)

Handling and disposal.

##### 5.1.3 Air-Bag and Explosive Pretensioner Handling

Manual deployment, shipping, and disposal.

##### 5.1.4 Pulling Precautions

Recommended anchoring locations.

#### 5.2 Restraint Systems

Include information on disarming, post deployment service, diagnostics, repairs, replacement, and operational verification for the following items, whether mechanically or electronically controlled:

- a. Air-bag system, including occupancy sensors
- b. Seat-belt system, including pretensioners
- c. Knee bolsters
- d. Integrated child-safety seat
- e. Side-impact airbags

### 5.3 Materials Identification and Repair Processes

Include methods of identification, special procedures for repairing, joining and attaching (including adhesive bonding), and requirements for corrosion protection for the various materials in the vehicle. Include heat limitations where applicable.

#### 5.3.1 Steel

Include coated steels, special alloys, and the use of weld-through primers and weld-bond adhesives.

#### 5.3.2 Aluminum

Include special alloys, the use of structural adhesives and special rivets.

#### 5.3.3 Magnesium

#### 5.3.4 Plastics and Composites

Include the use of plastic welding and structural adhesives.

#### 5.3.5 Structural Foam

#### 5.3.6 Energy-Absorbing Foam

#### 5.3.7 Acoustic Foam

#### 5.3.8 Special Coatings

### 5.4 Structural Straightening

#### 5.4.1 Vehicle Dimension Specifications

Specify the locations and measurement tolerances, in three dimensions, of frame, underbody, upperbody, and engine compartment control and reference points, in mm (inches). Use an equipment-specific coordinate system when appropriate. See SAE J1828.

#### 5.4.2 Vehicle Clamping and Pulling

Identify the anchoring locations and methods.

#### 5.4.3 Stress-Relieving

Specify the maximum heating temperature and heating time for the various types of materials used in vehicle structures, including the following:

- a. Mild steels
- b. High-strength steels (including boron alloys, stainless steels, etc.)
- c. Aluminum alloys

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## 5.5 Structural Sectioning

Identify crush zones, cross members and reinforcements, and define cut locations, joint configurations, and partial-panel availability, for all structural items including the following:

- a. Front and rear unibody rails
- b. Front and rear frame rails
- c. A, B, C, and D pillars
- d. Rocker panels and floorpans
- e. Quarter panels and wheelhouses

## 5.6 Glass Replacement

Specify special replacement procedures, including fasteners, modular glass, integral moldings, bonding adhesives, drive-away times, etc. Include procedures for adjusting the "anti-pinch" feature of electrically powered regulators.

### 5.6.1 Stationary Glass

Include the following types:

- a. Windshield
- b. Backlite
- c. Quarter window
- d. Side or door window
- e. Roof window

### 5.6.2 Movable Glass

Include the following types:

- a. Door
- b. Roof
- c. Quarter
- d. Hatch
- e. Backlite
- f. Vent window
- g. Rear slider

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### 5.6.3 Specialty Glass

Include the following types:

- a. Heated (including full-view and wiper-parking areas)
- b. Integral antenna systems
- c. Glass-mounted antennas, mirrors, auto-brake sensors, etc.
- d. Outside rear-view mirrors
- e. Insulated glass
- f. Any other type of specialty glass, including head-up display, heat- or rain-sensing, etc.

### 5.7 Refinishing

Include paint codes and special application information.

#### 5.7.1 Surface Preparation

Include requirements for application of the following:

- a. Corrosion protection—Include procedures for new replacement parts.
- b. Primer and sealer
- c. Adhesion promoter

#### 5.7.2 Finish Application

Include special color-matching procedures for the following finishes:

- a. Single-stage
- b. Multi-stage

#### 5.7.3 Special Applications

Include special requirements for applying the following:

- a. Stone-guard coating
- b. Stripes
- c. Decals
- d. Color-compatible primer
- e. Chip-resistant primer

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