

Uniform Procedures For Collision Repair

WA01–Wheel Alignment, Front

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v.2.3



1. Description

This procedure describes methods for checking and restoring front-wheel alignment. Inspection and evaluation requirements are also included.



2. Purpose

The purpose of this procedure is to provide industry-accepted requirements for performing high-quality front-wheel alignments. This procedure is intended for use by professionals who are qualified through training and experience.



3. Referenced Documents

The following documents are considered part of this procedure by reference.

3.1 Procedures

- PS01 Personnel Safety
- WA11 Wheel Alignment, Rear

3.2 Other Information

- Equipment-specific information
- Vehicle-specific repair information



4. Equipment And Material Requirements

4.1 Wheel Alignment Equipment

Wheel alignment equipment must be capable of making these measurements:

- camber**
- caster**
- steering axis inclination (SAI)**
- toe**
- turning radius**



Wheel alignment equipment measurements must be repeatable and accurate to within $\pm 0.1^\circ$.



5. Damage Analysis

5.1 Wheel Alignment Conditions

A front-wheel alignment is necessary, following a collision, if any of these conditions exist:

- damaged steering or suspension parts
- damaged mounting locations
- engine cradle damage or position change
- a steering or suspension part has been loosened or removed for access or replacement
- visible impact to a wheel, tire, or suspension part
- a bent wheel
- worn steering or suspension parts are removed and replaced during repair procedures

Some vehicles may require a four-wheel alignment, depending on the damage. Follow the vehicle maker's recommendations.

If any abnormal tire wear is visible, alignment should be checked.

Any steering or handling complaints should be thoroughly checked as a possible out-of-alignment condition.



6. Personnel Safety

6.1 General Safety

General safety information is in **PS01**.

6.2 Equipment Setup Safety

To prevent injury during equipment setup:

- Follow the equipment maker's safety requirements.
- Ensure the vehicle is stable and secure before installing the alignment system.



7. Environmental Safety

Does not apply.



8. Vehicle Protection

8.1 Adjacent Panels

Protect adjacent panels when making underhood adjustments.



9. Repair Procedure

9.1 Pre-Alignment Conditions

These conditions must be met before performing a wheel alignment:

- The vehicle is level.
- The wheels are pointing straight ahead.
- Ride height** is within specifications.
- The tires are a matched set with the correct size and air pressure.
- The fuel tank is full.
- There is no added weight in the trunk or passenger compartment, unless required by the vehicle maker.
- Front seat is in the rearward position.
- Power steering parts are free of leaks.

(cont'd)



9. Repair Procedure (cont'd)

- No visible or measurable wear on the steering and suspension parts.
- Correct side-to-side and individual wheelbase measurements have been achieved.
- Non-driven, front-wheel bearings are properly adjusted.

9.2 Alignment Angles

To check and adjust the alignment angles:

- 1. Measure the alignment angles and compare to the vehicle maker's specifications.
- 2. Calculate the **included angle**. Compare to the vehicle maker's specifications.
- 3. Determine the required adjustments. If the readings indicate structural damage, make structural repairs. If the readings indicate bent or damaged parts, check the parts for damage. Replace parts as needed.
- 4. Make required adjustments, as necessary.
- 5. Inspect fasteners for damage. Replace any damaged fasteners or those required or specified by the vehicle maker. Torque to the vehicle maker's recommendations.



Ensure that side-to-side specifications are met. Use the vehicle maker's side-to-side tolerances, if listed. If not, use the following general side-to-side tolerances:

- camber $\pm 1/2^\circ$
- caster $\pm 1/2^\circ$
- steering axis inclination (SAI) $\pm 1/2^\circ$
- included angle $\pm 1/2^\circ$
- toe $\pm 1/16^\circ$
- turning radius $\pm 1 1/2^\circ$

Verify that the alignment angles are correct.



10. Use Of Recycled (Salvage) Parts

Does not apply.



11. Inspection And Testing

11.1 Inspection After Alignment

Inspect the vehicle, following a front-wheel alignment, for these conditions:

- suspension parts returned to their original mounting locations
- fasteners replaced as required by the vehicle maker
- correct fastener torque
- proper replacement of all parts



Road-test the vehicle, following the vehicle maker's recommendations, checking for any of these defects:

- shimmy
- pulling to one side
- improper steering return
- wander
- abnormal steering effort
- instability through turns
- instability while braking
- steering wheel off center when vehicle is in motion
- vibration
- bump steer conditions
- instability while accelerating
- abnormal torque steer

Make necessary repairs and re-check the wheel alignment.