RigRight

by Axletrac Alignment Tools

Heavy Duty Truck Alignment System

For Hub-Piloted Wheels

Measures: Thrust • Scrub • Toe • Camber • Caster

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Made in Southern Indiana, USA

Introduction

RigRight is a precision truck alignment system designed for Class 8 hub-piloted tandem drive axle trucks. Using the same trusted axle end extender technology that Axletrac has built for semi-trailer alignment since 2012, RigRight brings accurate, shop-floor alignment to heavy-duty trucks — with no alignment rack required.

RigRight measures and provides adjustment guidance for:

- Thrust Angle — rear drive axle perpendicularity to the frame
- Scrub — tandem axle parallelism (axle-to-axle matching)
- Toe — steer axle tire direction
- Camber — vertical tilt of steer tires
- Caster — steer axle forward/rearward tilt for directional stability

RigRight is intended for use by qualified mechanics and alignment technicians. This tool does not replace proper mechanical inspection of suspension, steering, and chassis components. Always inspect and repair worn or damaged components before performing alignment.

> *NOTE: Axletrac's heavy duty axle end extender and RigRight dual purpose heavy duty truck alignment technology was developed by Bob Hubbuch, founder of Axletrac Alignment Tools. RigRight is sold exclusively by Axletrac Alignment Tools, a family-owned business in southern Indiana.*

RigRight Semi-Truck Only Kit Contents

- 8x 12" extension tubes
- 4x 11.25" span bars (for drive axle and steer axle use)
- 2x RigRight Locking Square (jig) with integrated level
- 2x Framing tape measures
- 2x Magnetic Frame standoff brackets
- 1x Digital inclinometer
- 1x Alignment worksheet pad
- 1x Instruction manual

Web Calculator:

Access at www.axletracalignmenttools.com

Enter your measurements to receive automatic shim size recommendations and alignment values.

Step 1 — Vehicle Preparation and Positioning

Proper truck positioning before measurement is critical. Suspension components must be fully settled and relaxed before any measurements are taken. Rushing this step will produce inaccurate results.

1.1 — Surface Requirements

Position the truck on a flat, level concrete or asphalt surface. Avoid soft ground, gravel, or surfaces with visible slope or irregularity. The entire truck — all axles — must rest on the same continuous level surface.

1.2 — Approach and Stop

1. Drive the truck to the alignment area in a straight line.
2. Bring the truck to a slow, gradual stop. Do not brake suddenly.
3. Do not make any steering corrections or sudden steering inputs during the final approach. Allow the truck to track straight on its own.
4. Come to a complete stop and shift to neutral or park.

1.3 — Release and Settle

5. Release all brakes — both service brakes and parking/spring brakes. Maintain constant air pressure to brake system to avoid air bleed-off during procedure.
6. If the truck has an air suspension ride height control, set ride height to the manufacturer's specified operating height and allow the suspension to settle.
7. Inflate all tires to the manufacturer's specified operating pressure before proceeding. Tire pressure directly affects alignment readings.
8. Allow the truck to sit undisturbed for a minimum of 2–3 minutes to allow all suspension components — springs, airbags, torque rods, and bushings — to fully relax and settle into their neutral position.

> **⚠ IMPORTANT: Do not rock the truck or apply brakes between this step and measurement. Any of these actions will load suspension components and invalidate your baseline.**

1.4 — Chock Wheels

9. With brakes released and suspension settled, place wheel chocks in front of and behind at least one steer tire to prevent truck movement.
10. Do not re-apply brakes after chocking.

1.5 — Pre-Alignment Inspection

Before taking any measurements, perform a thorough visual and physical inspection of all alignment-related components. Aligning a truck with worn or damaged suspension parts will not produce a lasting or accurate result.

Inspect the following. Replace or repair any worn, damaged, or out-of-spec component before proceeding:

- Torque rod bushings — check for cracking, collapse, or excessive movement
- Hanger brackets — check for cracks, bends, or weld failures
- Spring leaves or airbag mounts — check for damage or uneven ride height
- Eccentric and concentric adjustment bolts — check for seizure or corrosion
- Steering components — tie rods, drag link, kingpins, ball joints
- Frame — check for visible bends, cracks, or collision damage in the area of the axles and hangers
- Tires — check for uneven wear patterns that may indicate existing alignment problems. Document before proceeding.

⚠ IMPORTANT: Do not proceed with alignment if any suspension, steering, or frame component is worn, damaged, or out of specification. Alignment adjustments made on a compromised chassis will not hold and may create unsafe conditions.

Step 2 — Axle End Extender Installation

The axle end extender assembly creates a self-centering, rigid reference point at the exact center of each axle hub, extending beyond the outer edge of the tire. This provides accurate measurement reference points without removing any hub components.

> *NOTE: The tire inflation system, hubodometer, or hubcap does NOT need to be removed for this step. Minor rim damage or tire irregularities do not affect the accuracy of the end extender assembly.*

2.1 — Installation on Tandem Drive Axles

Install one end extender assembly on each of the four hubs of the tandem drive axles — two on the left side, two on the right side.

For each hub, install as follows:

11. Select two opposing wheel studs near the 12 o'clock and 6 o'clock positions. (Fig 1)
12. Thread a 12" extension tube onto each of the two selected studs.
13. Tighten both extension tubes to hand-tight, then back off approximately 1/4 turn.
14. Apply lubricant such as bearing grease to pins for effortless installation and removal and insert pins of span bar into both extension tubes. (Fig 2)
15. Tighten both extension tubes snug to secure the span bar in position. (Fig 3)

The span bar and extension tube assembly self-centers to the hub and provides a rigid, accurate reference point at the center of the axle beyond the tire's outer edge.


Fig 1


Fig 2


Fig 3

2.2 — Aluminum Wheel Note (Alcoa and Similar)

NOTE: Some aluminum wheels, particularly Alcoa brand wheels, slightly converge their wheel studs when lug nuts are fully torqued. If the span bar is difficult to install, remove the extension tubes and remove the two opposing lug nuts from the 12 and 6 o'clock studs to allow those studs to relax before attempting span bar installation. This solution has been reviewed and confirmed as acceptable by Alcoa engineers. Be sure to reinstall and torque all lug nuts to specification after final removal of the Axletrac axle end extender assembly.

Step 3 — Lateral Axle Offset Check

This step verifies that each drive axle is centered within the frame — that is, equal distance from the frame rail on each side. The RigRight locking square is installed in the upward, vertical position on the end extender to provide a reference point directly above the axle centerline.

16. With the black steel arm of the jig and the silver aluminum arm locked into the stored position with arms overlapping in a single line and prior to engaging the locking square, install the RigRight locking square on the end extender on the right side of the front drive axle in the upright, vertical position. You should have an unobstructed view of the truck frame rail directly above the axle. (Fig 4)
17. Install the frame standoff bracket on the right frame rail, directly above the axle location. (Fig 5)
18. Measure from the standoff to the locking square. Record this value.
19. Repeat on the left side of the front drive axle.
20. Compare right and left measurements. Record on the worksheet if needed.

Acceptable tolerance: The difference between right and left measurements must be 0.5" or less (0.25" on either side of center).

- If within 0.5": Remove RigRight locking square from right side, proceed to Step 3.21
- If outside 0.5": Adjust per the truck or suspension manufacturer's axle centering procedure. Recheck. Once within tolerance, proceed.

21. Repeat Steps 3.16–3.20 on the rearmost (rearward) drive axle. Both axles must be within the 0.5" tolerance before proceeding to Step 4. Remove RigRight locking square from right side and place to the side for steer axle measurements later. (Fig 6)

⚠ IMPORTANT: If any axle centering adjustment was performed, remove RigRight locking squares, return to Step 1 and allow the suspension to fully settle before continuing to thrust angle measurement Step 4.

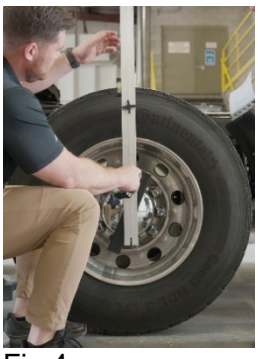
Fig 4

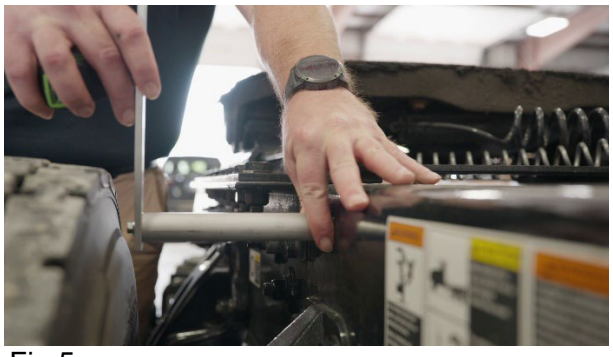
Fig 5


Fig 6

Step 4 — Baseline Thrust Measurement – Rear Drive Axle Thrust

Thrust angle is the angular relationship of the rear drive axle to the vehicle's centerline (frame). A thrust angle of zero means the rear axle is perfectly perpendicular to the frame. Thrust angle error causes the truck to dog-track contributing to driver fatigue, decreased fuel efficiency and accelerated tire wear.

The RigRight system uses two frame standoff measurements — one in front of and one behind the axle — to detect thrust angle. These frame standoffs eliminate inaccuracy in measurements due to obstructions caused by frame attachments at desired measurement site. The locking square is installed with the black steel arm in an upward, vertical position with the silver aluminum arm horizontal and level with the floor.

4.1 — Setup

22. With end extenders installed on left and right side of both tandem drive axles, install the RigRight locking square on the left rear drive axle end extender, unlock the aluminum arm and rotate 90° and lock into T square configuration using the black handle bolt. Orient upward and vertical, silver aluminum arm parallel to the floor. Verify level. (Fig 7)
23. Remove debris and rust or other build-up on the truck frame using a wire brush or other method in the desired standoff placement location. Place one frame standoff on the left frame rail, approximately 20 inches in front of the rear drive axle at the same height as the horizontal silver aluminum arm and the same distance from the axle at the very end of the aluminum arm of the locking square. Any significant angle up/down or in/out of the tape measure will result in an inaccurate measurement.
24. Place a second frame standoff on the left frame rail, approximately 20 inches behind the rear drive axle at the same height as the horizontal silver aluminum arm and the same distance from the axle at the very end of the aluminum arm of the locking square. Any significant angle up/down or in/out of the tape measure will result in an inaccurate measurement.

Fig 7

4.2 — Measurement

25. Using a tape measure, measure from the rear standoff to the rear edge of the locking square. Record this as the "REAR SIDE READING" on **Worksheet Step 1** or in the web calculator. (Fig 8)
26. Measure from the front standoff to the front edge of the locking square. Record as the "FRONT SIDE READING" in **Worksheet Step 1** or in the web calculator. Scan the QR code below on your web enabled smart device to access web calculator. (Fig 9)

Fig 8

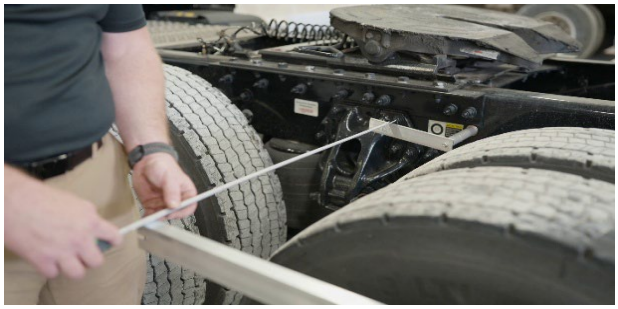

Fig 9

Subtract front from rear (Rear-Front). This represents the BASELINE THRUST (BOX 1). Do not adjust anything yet — runout correction is performed in the next step before the actual misalignment amount can be determined.

Web Calculator

www.axletracalignmenttools.com/calculator/

Step 5 — Rear Drive Axle Thrust Angle: Runout Compensation

Wheel, tire, and stud variation can introduce small measurement errors called "runout." Runout must be identified and accounted for to determine the true axle misalignment. This step rotates the wheel 180° and takes a second set of measurements. The calculator or worksheet automatically averages the two passes to eliminate runout error.

> *NOTE: Leave the frame standoffs and all four axle end extenders installed throughout this step. Only the locking square is removed and reinstalled.*

27. Remove the RigRight locking square from the end extender. The end extender assembly remains installed.
28. Using chalk, tape or a paint marker, mark the top of the left rear drive tire at the 12 o'clock position.
29. Remove the wheel chocks. Slowly roll the truck forward — or have an assistant do so — until the marked tire has rotated exactly 180° so the mark is now at the 6 o'clock position.
30. Rechock the wheels. Ensure the truck is stationary and stable before proceeding.
31. Reinstall the RigRight locking square in upward vertical position on the end extender. Verify level.
32. Measure rear standoff to locking square reference. Record as "REAR SIDE READING" in **Worksheet Step 2.**
33. Measure front standoff to locking square reference. Record as "FRONT SIDE READING" in **Worksheet Step 2**. Subtract front from rear (rear-front) to determine **RUNOUT THRUST (BOX 2).**

5.1 — Calculating Shim Size

Enter all four values (Front Baseline, Rear Baseline, Front Runout, Rear Runout) into the worksheet or web calculator. Follow the **Worksheet Steps 3 and 4** or allow the calculator to automatically determine:

- How much compensation is needed for the runout – WORKSHEET STEP 3: **RUNOUT CORRECTION AMOUNT (BOX 3)**
- The actual thrust misalignment amount (corrected for runout) AND recommended shim size to achieve 0° thrust angle (+/- 0.1°degrees) – WORKSHEET STEP 4: **RECOMMENDED SHIM ADJUSTMENT VALUE**
- Whether shim should be added or removed

A negative value indicates the thrust misalignment is leftward of center. A positive value indicates rightward of center.

5.2 — Adjustment

The most common adjustment location for eccentric/concentric screw suspension systems is the left frame hanger. For eccentric/concentric screw adjustment suspensions, rotate the adjustment until the rear minus front measurement from the standoff to the locking square is equal to the RUNOUT CORRECTION AMOUNT in box 3 of the worksheet or as shown on the web calculator when the tire mark is in the 6 o'clock position. Once the rear – front measurement is equal to the RUNOUT CORRECTION AMOUNT in box 3 of the worksheet or as shown on the web calculator, remove the locking square and return to Manual Step 1. Position the truck with the tire mark at the 6 o'clock position and allow the truck suspension components to settle. Reinstall the locking square upright and level. **Verify that the front minus rear measurement is equal to or within 1/16" of the RUNOUT CORRECTION AMOUNT in box 3 of the worksheet or as shown on the web calculator.** This equates to a thrust angle of +/- 0.1° degrees. This is within SAE J875 and the strictest OEM parameters.

34. For shim adjusted suspension systems, make the recommended shim addition or removal as determined by the RECOMMENDED SHIM ADJUSTMENT VALUE on the worksheet or as shown on the calculator per the truck manufacturer's procedure.
35. Once shim adjustment is complete, remove the locking square. Remove chocks, drive the truck out and back into the original position per Manual Step 1 with marked tire set at the 6 o'clock position, re-chock, and allow suspension to settle.
36. Reinstall the locking square upright and level. **Verify that the front minus rear measurement is equal to or within 1/16" of the RUNOUT CORRECTION AMOUNT in box 3 of the worksheet or as shown on the web calculator.** This equates to a thrust angle of +/- 0.1° degrees. This is within SAE J875 and the strictest OEM parameters.

> *NOTE: Once the rear drive axle is verified perpendicular to the frame, remove the locking squares from the drive axle area and set aside for use on the steer axle in later steps.*

NOTE: Axletrac Alignment Tools, Inc. recognizes that some fleets intentionally set tandem rear axles with a controlled scrub offset. This practice is not recommended by any Class 8 OEM and is contrary to TMC Recommended Practice 642B, which specifies 0° as the target for both scrub and thrust. For reference: for the rear drive axle measurement, each 1/32" by which your final setting differs from the calculated Runout Correction Amount introduces approximately 0.04° of thrust angle. Matching the Runout Correction Amount exactly produces a 0° thrust angle.

Step 6 — Tandem Axle Scrub Matching / Scrub Elimination

Scrub is the result of the two tandem drive axles not being parallel to each other. Even when both axles are individually within thrust angle tolerance, if they are not parallel, the truck will scrub its tires and consume fuel fighting itself. This step compares the axle-to-axle distance on each side.

> *NOTE: All four end extenders must remain installed on the tandem drive axles for this step.*

37. Using a tape measure, measure from the pin of the front left end extender to the pin of the rear left end extender. Record this value in **Worksheet Step 5** or in the calculator. (Fig 10)
38. Repeat on the right side: measure front right end extender pin to rear right end extender pin. Record in **Worksheet Step 5.**
39. Follow the instructions on Worksheet Step 5: multiply the difference between left and right measurements by ***0.38 (38%)*** to find the shim size recommendation to correct scrub. The web calculator will do this automatically once both side measurements are entered.
40. For eccentric/concentric screw adjustment suspensions: rotate the adjuster until the left and right pin-to-pin measurements are equal.
41. Once both drive axles are perpendicular to the frame and the tandem spacing is matched, move the truck out and back into position as in Manual Step 1 and allow the suspension to settle. Verify pin-to-pin measurements are equal on the left and right side and proceed to the steer axle setup.

Fig 10

NOTE: Axletrac Alignment Tools Inc. recognizes that some fleets intentionally set tandem rear axles with a controlled scrub offset, though this falls outside standard OEM alignment specifications and is contrary to TMC Recommended Practice 642B. As a reference guide: on the front drive axle, each 1/32" by which the left and right pin-to-pin measurements differ introduces approximately 0.04° of scrub angle. Equal pin-to-pin measurements on both sides produce 0° of scrub — confirming true parallelism between the tandem axles.

Step 7 — Steer Axle Toe Measurement

> **⚠ IMPORTANT: For all steer axle steps, the steer axle tires must be resting on low-friction turn plates so the wheels can rotate freely without loading suspension components. Turn plates are not included with RigRight and are not available from Axletrac. Many quality commercial turn plates are available, or a simple shop-made solution — two smooth plastic sheets with a thin layer of grease between them — works well.**

Toe is the inward or outward angle of the steer tires relative to the vehicle centerline, viewed from above. Incorrect toe causes rapid shoulder tire wear and fuel loss.

7.1 — Locking Square Setup for Toe

42. Using the 12” extension tubes and span bars used on the drive axles to create the axle end extender, install the RigRight locking square over the end extender on the left steer axle hub. When measuring toe, orient the locking square in the DOWNWARD vertical position beneath the axle with the level on the top side of the horizontal silver aluminum arm. Verify the tool is level. (Fig 11)
43. Repeat on the right side steer axle end extender.

Fig 11

7.2 — Measurement

44. Hook the tape measure to the notched end of the left locking square and measure across to the right locking square. Take this measurement BEHIND the steer tires (at the very end of the silver aluminum arm). Record on **Worksheet Step 6** as "behind steer tires" value. (Fig 12, 13, 14)
45. Repeat the same measurement AHEAD of the steer tires. Record on **Worksheet Step 6** as "in front of steer tires" value.
46. Calculate: Rear value minus Front value. This result is your toe value. Record on the worksheet.
47. Adjust per the truck manufacturer's tie rod adjustment procedure as needed.

> *NOTE: It does not matter whether you measure left-to-right or right-to-left, as long as you are consistent for both the front and rear measurements.*

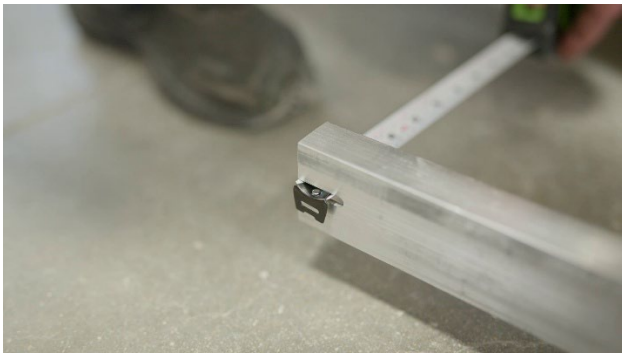

Fig 12

Fig 13

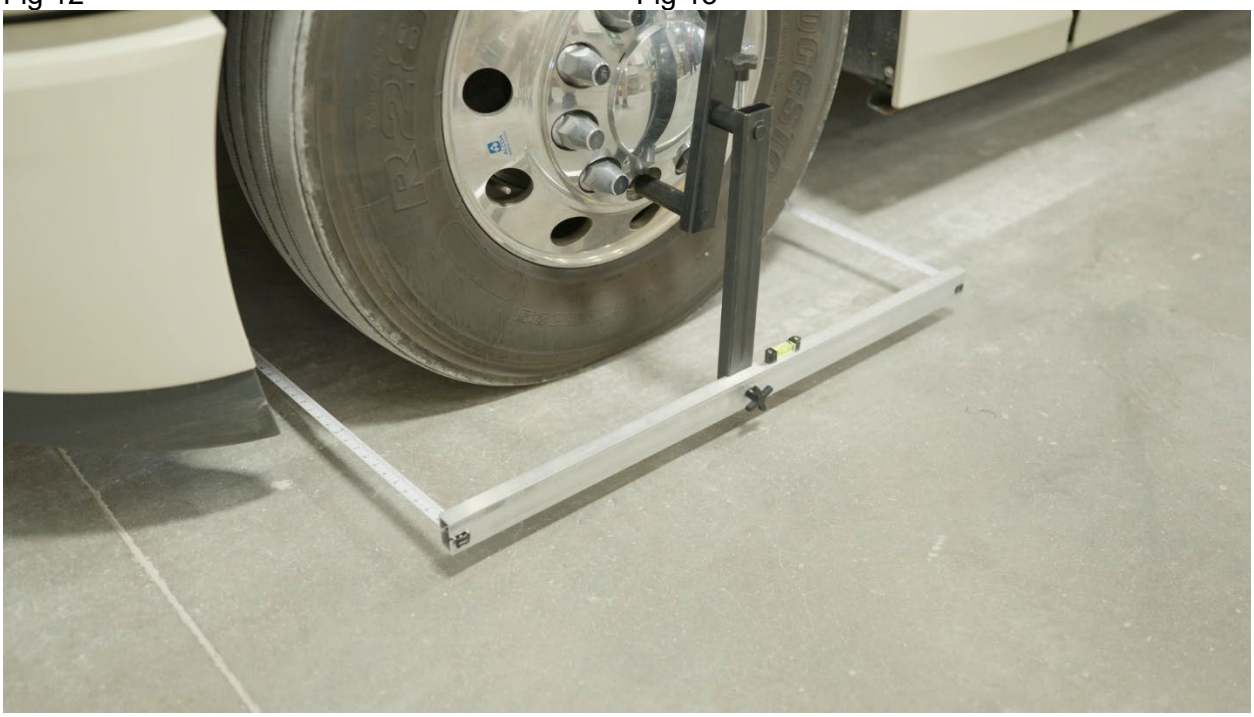

Fig 14

Step 8 — Steer Axle Caster Measurement

Caster is the forward or rearward tilt of the steer axle king pin, viewed from the side. Correct caster provides steering returnability and directional stability. Caster is measured using the magnetic digital inclinometer on the locking square while the steer wheel is turned through a defined arc.

> *NOTE: The locking squares remain installed on the steer axle end extenders from Step 7.*

48. Place the magnetic digital inclinometer on the outer surface of the black steel arm of the RigRight locking square on the left steer axle. You may remove the silver aluminum arm if you wish. It is not used in Steps 8 or 9 except to ensure the black steel arm remains perfectly vertical. (Fig 15)
49. Turn the steer wheel 20° outward (away from center). Zero the inclinometer at this position.
50. Turn the steer wheel 20° inward (toward center). Record the inclinometer reading in **Worksheet Step 6**. This is your caster value for the left side.
51. Repeat on the right side locking square. Turn right wheel 20° outward, zero, turn 20° inward, record in **Worksheet Step 6**.

Industry standard caster for Class 8 trucks is typically 3° to 5° positive. Consult the truck manufacturer's specifications for the precise acceptable range for your vehicle. Unequal caster side-to-side (greater than 0.5° difference) can cause pull. Adjust per manufacturer's procedures if outside specification.

Fig 15

Step 9 — Steer Axle Camber Measurement

Camber is the inward or outward tilt of the steer tire relative to vertical, viewed from the front. Most Class 8 trucks are designed for zero or slightly positive camber. Camber is measured using the magnetic digital inclinometer on the locking square.

9.1 — Floor Reference

52. Place a long, flat, straight object (you may use the aluminum arm for this) on the floor in front of the wheels.
53. Return wheels to center. Place the magnetic digital inclinometer on the flat object and zero the meter. This corrects the reading for any floor slope. (Fig 16)

Fig 16

Fig 17

9.2 — Measurement

54. Transfer the inclinometer to the outer surface of the black steel arm of the RigRight locking square on the left steer axle. Record the camber reading in **Worksheet Step 6**. (Fig 17)
55. Repeat on the right side, record.

Industry standard camber for Class 8 steer axles is typically 0° to +1° positive. Consult manufacturer specifications. Camber is generally not adjustable on most Class 8 trucks without specialty components — document readings for records and investigate root causes (worn king pins, bent axle beam) if readings are out of specification.

Completion and Documentation

- ✓ Once all measurements are complete and adjustments made, remove all locking square assemblies, end extenders, span bars, and extension tubes from the truck. Ensure all lug nuts are reinstalled and torqued to specification, including any that were loosened during aluminum wheel span bar installation.
- ✓ Record all final alignment values — thrust angle, scrub, toe, camber, and caster — on the worksheet or in the web calculator for documentation. Retain your service records.
- ✓ Road test the vehicle. Observe for straight tracking, centered steering wheel, and absence of pull. Tire wear patterns should improve with each subsequent service interval following a proper RigRight alignment.

LIMITED WARRANTY

Axletrac Alignment Tools, Inc. warrants the RigRight Alignment System, including axle end extenders, locking squares, span bars, extension tubes, frame standoff brackets, and associated components, to be free from defects in materials and workmanship for a period of three (3) years from the original date of purchase.

If a defect in materials or workmanship is discovered during the warranty period, Axletrac Alignment Tools, Inc. will, at its sole discretion, repair or replace the defective product at no charge to the original purchaser.

WARRANTY CONDITIONS

• Proof of purchase is required for all warranty claims.

• Products must be shipped prepaid to Axletrac Alignment Tools, Inc. or an authorized Axletrac dealer for inspection and evaluation.

• Warranty coverage applies only to the original purchaser and is non-transferable.

EXCLUSIONS

This warranty does not cover:

• Normal wear and tear

• Cosmetic damage that does not affect product performance

• Damage caused by misuse, abuse, neglect, improper installation, improper maintenance, or unauthorized modification

• Damage resulting from accidents, collisions, fire, flooding, corrosion, or other external causes

• Products lost or damaged during shipment

LIMITATION OF LIABILITY

Axletrac Alignment Tools, Inc. shall not be liable for any incidental, consequential, indirect, special, or punitive damages arising from the use of, or inability to use, this product, including but not limited to vehicle downtime, lost revenue, lost profits, towing expenses, labor charges, or replacement equipment costs. The sole remedy under this warranty is the repair or replacement of the defective product.

Some states, provinces, or jurisdictions do not allow limitations on incidental or consequential damages, so the above limitations may not apply to you.

LEGAL RIGHTS

This warranty gives you specific legal rights. You may also have other rights that vary from state to state, province to province, or country to country. Contact Kathleen@AxletracAlignmentTools.com