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Service Bulletin Trucks

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> Wheel Alignment Steer and Drive Axles VN, VHD

Alignment Specifications and Procedures



(Effective from September 2000)

W6000345

Over the past two years, representatives from Volvo Trucks North America actively participated, along with twenty-two companies, in developing Recommended Practice 642 entitled "Total Vehicle Alignment: Recommendations for Maximizing Tire and Alignment related Component Life." Recommended Practice 642 (RP 642) is published by the Maintenance Council, American Trucking Associations, Inc.

Minor changes were made to Service Bulletin 601–06 to align all information directly with RP 642.

Companies that participated in the development of RP 642 are listed in that RP.

This bulletin gives the correct specifications and service procedures for total vehicle alignment on VN and VHD models.

See:

Specifications	"Wheel Alignment Specifications" page 2
Design & Function	"Wheel Alignment Angles" page 3
Service Procedures	"Toe-in, Checking (Trammel Bar Method)" page 5 "Drive Axle Thrust Angle, Checking" page 7

Specifications

Wheel Alignment Specifications

See also "Alignment Specifications and Procedures" page 1.

The following alignment specifications represent the industry standard established for a mid point target value on wheel alignment. Setting alignment for the target value minimizes inherent variations in measurement systems and provides optimum tire life. All values given in the table are for unladen vehicles with no trailer connected.

Note: Actual measurement can vary and still meet factory specifications. Contact the original equipment manufacturer for specification questions.

Steer Axle:	
Toe-In	1.5 mm 1/16 in. 0.08°
Camber	Less than 1/4°(3)
Caster	+2.5 ± 1.0°
Drive Axle:	
Thrust angle (Square)	0.0° or 0 in.
Scrub (Parallelism)	0.0° or 0 in.
Lateral Offset	0 in.
Trailer Axles & Dollies:	
Thrust angle (Square)	0.0° or 0 in.
Scrub (Parallelism)	0.0° or 0 in.
Lateral Offset	0 in.

NOTES:

1. All specifications are measured with vehicle in static, unladen condition.

2. All specifications are stated in inches or degrees (where applicable).

3. Camber angle changes normally involve bending the axle beam, which may void the axle manufacturer's warranty. If the measurement exceeds this value consult the vehicle, axle, and/or alignment equipment manufacturer.

Design and Function

Wheel Alignment Angles

See also "Alignment Specifications and Procedures" page 1.

Toe-In

Toe-in is set for the front wheels to counteract the natural tendency of the front wheels to spread out at the front when the vehicle is driven. Too much toe-in or toeout will produce a scrubbing of the outside or inside treads, reducing useful tire life.

Always check the toe-in measurement regularly. Proper toe is considered the most important measurement for achieving long tire life. Always check the toe after camber and caster.



Toe-In: measurement A should be smaller than B.

Caster

Caster is set for the whole axle by shims placed between the springs and the front axle beam; caster is preset and does not normally need adjustment. If the caster angle is not within specification, the caster shims are probably installed incorrectly.

Note: High positive caster increases steering effort. Low caster setting decreases steering effort and causes vehicle to wander.



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- 1 Vertical line
- 2 King pin center line
- 3 Caster angle

Camber

Camber is set by the axle manufacturer and is not adjustable by field service procedures. For any problems with camber, contact the axle manufacturer.



- 1 Vertical line
- 2 Wheel center line
- 3 Camber angle (C D)

Turn Angles

Turn angles are set according to wheel base. Correctly set angles reduce tire scrub while making a turn. Before adjusting turn angles, check camber, caster and toe.

Note: If large adjustments are made to the turn angles, always check the off loading valves in the power steering gear (if equipped).



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Service Procedures

6010-06-02-14 Toe-in, Checking (Trammel Bar Method)

See also "Alignment Specifications and Procedures" page 1.



Before working on a vehicle, set the parking brakes, place the transmission in neutral, and block the wheels. Failure to do so can result in unexpected vehicle movement and can cause serious personal injury or death.

1

For the toe-in check, use a work bay with level floor. Drive the vehicle in a straight line into the bay to avoid putting stress on the front wheels from the steering system.

2

In order to create a vertical reference line, place a 127 mm (5 in.) piece of masking tape parallel to the tread rib on the rear part of both of the tires. The side of the tape edge creates a sharp, clear line that the measurement will be taken from.

3



Position the trammel bar behind the front tires. Adjust the pointers to the edges of the tape pieces.



1 Masking tape

2 Trammel bar

Trammel bar pointers must be at center line spindle height.

5



W6001297

To indicate the correct height (mark to be used later), make a horizontal mark across the tape at the tip of the pointer on one side.

6

W6001296

Carefully remove trammel bar from behind the wheels.



Drive the truck forward until mark on the tape travels exactly 180° .

8

W6001298

Position trammel bar at the front of the tires. Position one pointer to the edge of the tape on one side.



Measure the toe between the pointer and the edge of the tape on the opposite tire to get the total toe measurement.

10

Adjust the toe, if necessary. Recheck after adjustment using the same procedure as above.

Note: The toe-in should always be reset to factory specification.

6010-06-02-15 Drive Axle Thrust Angle, Checking

See also "Alignment Specifications and Procedures" page 1.

Before working on a vehicle, set the parking brakes, place the transmission in neutral, and block the wheels. Failure to do so can result in unexpected vehicle movement and can cause serious personal injury or death.

Due to the location of fenders or other body components, the use of this procedure on some models will be limited.



W6001303

- 1 Thrust angle
- 2 Thrust line
- 3 Geometric center line

1

Drive the vehicle into a workbay with level floor. Steer in as straight as possible. Do not set any brakes. Chock wheels to avoid binding suspension.

2

Check run out on the wheels. Any lateral run out for the wheel or on the tire wall can affect the accuracy of this method. This method does not allow for lateral run out in wheel rim on cast spoke wheels. If there is excessive lateral run out on cast spoke wheels , use a dial indicator and adjust.

Note: Please remember that care and precision gets the best results.

3



- Tape measure
- 2 String

1

Attach a sturdy string (2) to the vehicle frame (at any convenient place) behind the forward drive wheel on the left side of the vehicle.

4

Loop the string through the tire tread at approximate center line of the hub at approximate 3 o'clock position. Stretch the string out to the front of the vehicle.

5

Keep tension on the string and hold it parallel to the floor. Have an assistant check the rear tire. Hold a tape measure (1) to the frame at a 90 degree angle at the same height as the string. Slowly walk the string in toward the frame until the assistant tells when the string contacts the front part of the tire side wall. Read off the distance from the frame on the tape measure. If the frame is not accessible, measure to the center of the front axle hub. Record this measurement.

Note: Center axle before using it as a reference for the measurement.

6

Repeat the process on the opposite side of the vehicle and record the measurement.

7

Compare the measurements. When the thrust angle is square to the center line of the frame, the measurements are equal. If one is greater than the other, adjust the rear suspension by removing or adding shims from the right side of the vehicle if equipped with a 4–spring or air ride. Other suspensions are adjusted differently.

Note: The Reyco suspensions are adjusted by a threaded rod arrangement or an eccentric bushing located in the forward rear spring hanger bracket.

8

Adjust and re-measure both sides until the measurements are equal. Now the front drive axle is square to the frame. The maximum difference between the two measurements should not be more than 6 mm (0.25 in.). 9



W6001301

Set the rear drive axle to the front drive axle using a trammel bar such that the spacing on the left and the right side are equal within 3 mm (1/8 in.). Use the machined dimple in the center of the hub to position the trammel bar.

10

When the adjusting has been completed, take the vehicle out on the road for a test drive. Check measure when returning.