



## WHEEL BEARING ADJUSTMENT PROCEDURES

### PREFACE

The following Recommended Practice is subject to the Disclaimer at the front of TMC's *Recommended Maintenance Practices Manual*. Users are urged to read the Disclaimer before considering adoption of any portion of this Recommended Practice.

### OBJECTIVE

The goal of this Recommended Procedure is to achieve a verifiable wheel bearing end play of 0.001" to 0.005" (0.025 mm to 0.127 mm).

### SCOPE

The following service procedures apply to steer, drive, and trailer axle assemblies using conventional double nut or single nut systems. Follow these service procedures carefully to prevent premature wheel end component failure and increase seal and bearing life.

ABS (anti-lock braking systems) and traction control systems with wheel end sensing require precise bearing adjustment to function properly.

This Recommended Practice details proper service procedures for D-type, bendable-type, and dowel-type spindle nut washers.

**NOTE:** For single nut self-locking systems, consult manufacturers' instructions.

If you have a system that differs from what is indicated in this procedure, consult the vehicle manufacturer's recommended procedure.

**WARNING:** Never work under a unit supported by only a jack. Always support the vehicle with stands. Block the wheels and make sure the unit will not roll before releasing brakes.

**CAUTION:** If your axle is equipped with spoke wheels and the rim clamps have been disassembled to remove the tire and rim assembly, the tire and rim assembly must be reinstalled and the rim clamps properly torqued BEFORE

adjusting the wheel bearings. Failure to do this may result in improper wheel bearing adjustment.

### REFERENCES

TMC RP 622, *Wheel Seal and Bearing Removal, Installation and Maintenance*.

### PROCEDURES

**Step 1:** Lubricate the bearing with clean axle lubricant of the same type used in the axle sump or hub assembly.

### IMPORTANT

- (a) In oil bath systems that rely on differential fill to provide lubricant to the wheel seals, do not pack bearings with grease before installation. Grease will temporarily restrict or prevent the proper circulation of axle lubricant and may contribute to wheel seal failure.
- (b) Never use an impact wrench to adjust wheel bearings.

**Step 2:** After the wheel hub and bearings are assembled on the spindle or axle tube, torque the inner (adjusting) nut to 200 lbf•ft (271 N•m) while rotating the wheel hub assembly. Refer to **Table 1** at the end of this Recommended Practice.

**Step 3:** Back off the inner (adjusting) nut one full turn. Rotate the wheel.

**Step 4:** Re-torque the inner (adjusting) nut to 50 lbf•ft (68 N•m) while rotating the wheel hub assembly. Refer to **Table 1** at the end of this Recommended Practice.

**Step 5:** Back off the inner (adjusting) nut. Refer to **Table 1** at the end of this Recommended Practice for the proper back-off amount.

**Step 6:** Install the locking washer.

If dowel pin and washer (or washer tang and nut flat) are not aligned, remove the washer, turn it over and reinstall. If required, loosen the inner (adjusting) nut just enough for alignment.

#### **IMPORTANT**

**Never tighten the inner (adjusting) nut for alignment at this point of the procedure. This may pre-load the bearing and cause premature failure.**

**Step 7:** Install and torque the outer (jam) nut. Refer to **Table 1** at the end of this Recommended Practice for proper torque values.

**NOTE:** This adjustment allows the wheel to rotate freely with 0.001" to 0.005" (0.025 mm to 0.0127 mm) end play.

**Step 8:** Verify end play with a dial indicator. Wheel end play is the free movement of the tire and wheel assembly along the spindle axis.

(a) Make sure the brake drum-to-hub fasteners are tightened to the manufacturers' specifications.

(b) Attach a dial indicator with its magnetic base to the hub or brake drum.

(c) Adjust the dial indicator so that its plunger or pointer is against the end of the spindle with its line of action approximately parallel to the axis of the spindle. See **Fig. 1**.

(d) Grasp the wheel assembly at the 3 o'clock and 9 o'clock positions. Push the wheel assembly in and out while oscillating it to seat the bearings. Read bearing end play as the total indicator movement.

**NOTE:** If end play is not within specification, readjustment is required.

#### **Step 9: RE-ADJUSTMENT PROCEDURE**

##### **Excessive End Play**

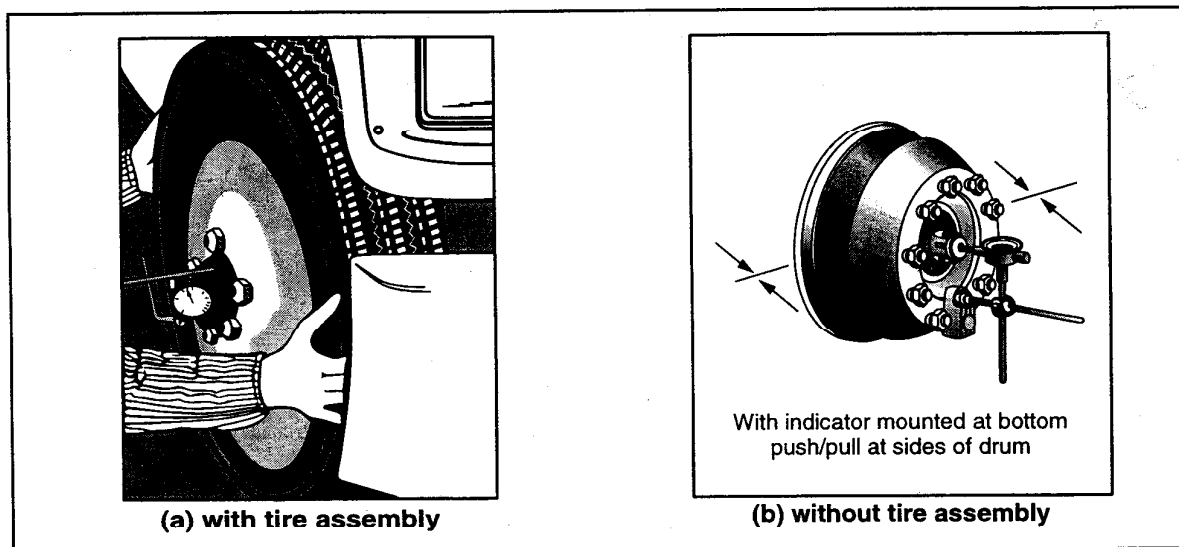
If end play is too loose, remove the outer (jam) nut and pull the washer away from the inner (adjusting) nut, but not off the spindle. Tighten the inner (adjusting) nut to the next alignment hole of the washer. Reassemble the washer and re-torque the outer (jam) nut. Refer to **Table 1** for torque values. Verify end play with a dial indicator.

##### **Insufficient End Play**

If end play is not present, remove the outer (jam) nut and pull the washer away from the inner (adjusting) nut, but not off the spindle. Loosen the inner (adjusting) nut to the next alignment hole of the washer. Reassemble the washer and re-torque the outer (jam) nut. Refer to **Table 1** for torque values. Verify end play with a dial indicator.

##### **FINE TUNING THE ADJUSTMENT**

If, after performing the readjustment procedures, end play is 0.004" - 0.005" (0.102 mm - 0.127 mm) range, repeat the appropriate procedures, removing the washer from the spindle, tighten or loosen



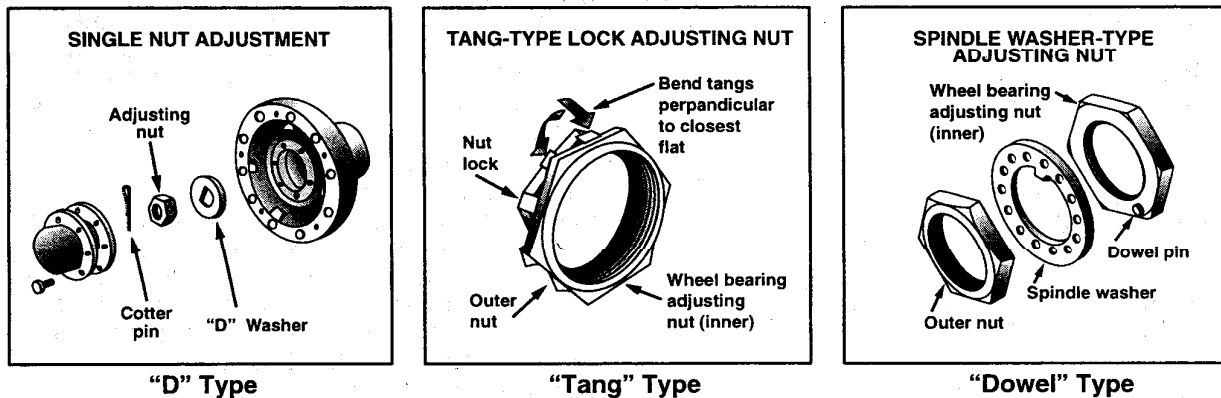
**Fig. 1: Dial Indicator Set-Up**

the inner adjusting nut the equivalent of 1/2 of an alignment hole of the washer, or reversing the alignment washer, and reinstalling it onto the spindle. Reassemble and re-torque the outer (jam) nut. Refer to **Table 1** for torque values. Verify end play with a dial indicator.

**NOTE: Bendable-type washer lock only: Secure nuts by bending one wheel nut washer tang over**

**the inner and outer nut. Bend the tangs over the closest flap perpendicular to the tang. See Fig. 2.**

**CAUTION: Before operating the unit, the wheel hub cavities and bearings must be lubricated to prevent failure. For final wheel end assembly refer to TMC RP 622.**



**Fig. 2: Adjusting Nut Identification and Installation**

**TABLE 1**

WHEEL BEARING ADJUSTMENT PROCEDURE											
STEP 1: Lubricate the wheel bearing with clean axle lubricant of the same type used in the axle sump or hub assembly. Note: Never use an impact wrench when tightening or loosening lug nuts or bolts during the procedure.											
INITIAL ADJUSTING NUT TORQUE	INITIAL BACK OFF	FINAL ADJUSTING NUT TORQUE	BACK OFF			JAM NUT TORQUE		ACCEPTABLE END PLAY			
			AXLE TYPE	THREADS PER INCH	FINAL BACK OFF	NUT SIZE	TORQUE SPECIFICATIONS				
STEP 2	STEP 3	STEP 4		STEP 5	STEP 6	STEP 7		STEP 8			
200 lb•ft (271 N•m) While Rotating Wheel	One Full Turn	50 lb•ft (68 N•m) While Rotating Wheels	Steer (Front) Non-Drive	12	1/6 Turn *	Install Cotter Pin to Lock Axle Nut in Position		0.001"-0.005" (.025-.127 mm)			
				18	1/4 Turn *						
				14	1/2 Turn	Less Than 2-5/8" (66.7 mm)	200-300 lb•ft (271-407 N•m)				
				18							
			Drive	12	1/4 Turn	Dowel Type Washer	300-400 lb•ft (407-542 N•m)	As Measured Per Procedure With Dial Indicator			
				16		Tang Type Washer **	200-275 lb•ft (271-373 N•m)				
			Trailer	12	1/4 Turn	2-5/8" (66.7 mm) and over	300-400 lb•ft (407-542 N•m)				
				16							
<p>* If dowel pin and washer (or washer tang and nut flat) are not aligned, remove the washer, turn it over, and reinstall. If required, loosen the inner (adjusting) nut just enough for alignment.</p> <p>** Bendable type washer lock only: Secure nuts by bending one wheel nut washer tang over the inner and outer nut. Bend the tangs over the closest flat perpendicular to the tang.</p>											