

SERVICE MANUAL

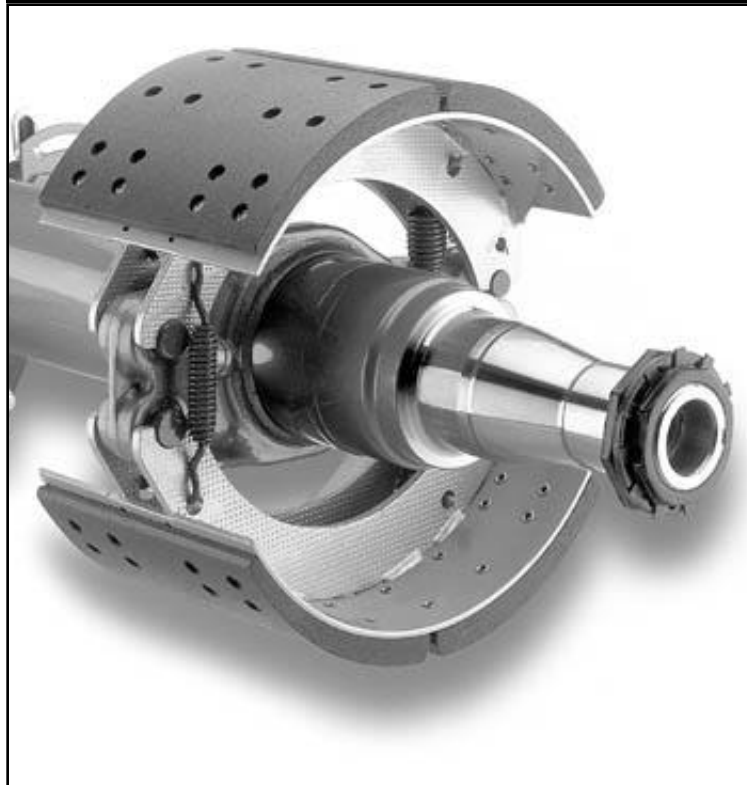
INSTALLATION AND  
FIELD MAINTENANCE  
FOR SPICER TRAILER  
AXLES, BRAKES, AND  
COMPONENTS

D22/P22 SERIES

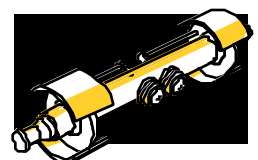
**SPICER**<sup>®</sup>

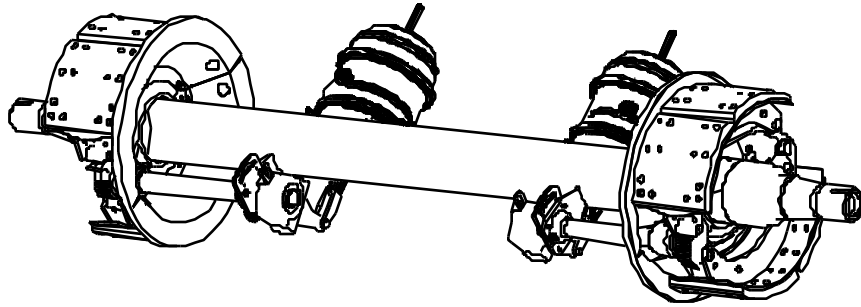


TRAILER PRODUCTS

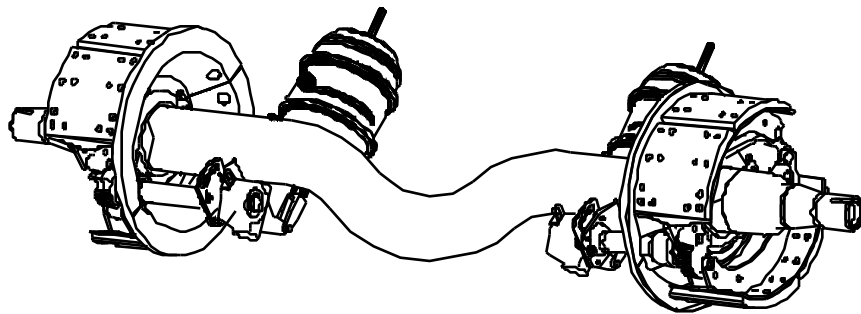


S P I C E R





SPICER D22 AX (STRAIGHT)



SPICER D22 AU (BENT OR DROP)

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## INTRODUCTION

Spicer Trailer Products are engineered to meet the demanding requirements of the trucking industry. This manual is provided to help maintain the safety, dependability and performance designed into Spicer Trailer Products. Study this manual carefully before you perform installation or maintenance procedures.

You will find **DANGER**, **WARNING**, **CAUTION**, and **NOTE** symbols and statements throughout this manual.

**!** **DANGER** THIS SYMBOL IS USED TO INDICATE IMMINENTLY HAZARDOUS SITUATIONS WHICH, IF NOT AVOIDED, WILL RESULT IN SERIOUS INJURY OR DEATH.

**!** **WARNING** THIS SYMBOL IS USED TO INDICATE POTENTIALLY HAZARDOUS SITUATIONS WHICH, IF NOT AVOIDED, COULD RESULT IN SERIOUS INJURY OR DEATH.

**!** **CAUTION** THIS SYMBOL IS USED TO INDICATE POTENTIALLY HAZARDOUS SITUATIONS WHICH, IF NOT AVOIDED, MAY RESULT IN PROPERTY OR EQUIPMENT DAMAGE.

**!** **NOTE** THIS SYMBOL IS USED TO INDICATE THAT YOU MUST DO SOMETHING IN ORDER FOR THE AXLE OR BRAKE TO FUNCTION PROPERLY.

If you have any questions about this manual or its instructions, contact Spicer Trailer Products at (334) 286-7000.

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# SPICER®



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## SAFETY PRECAUTIONS

**⚠ WARNING** BEFORE PERFORMING ANY MAINTENANCE OR REPAIR WORK REQUIRING RAISING OF VEHICLE, ENSURE VEHICLE IS PROPERLY SUPPORTED WITH LIFT STANDS OF SUFFICIENT RATED CAPACITY. DO NOT RELY ON JACKS ALONE FOR SUPPORT OF VEHICLE.

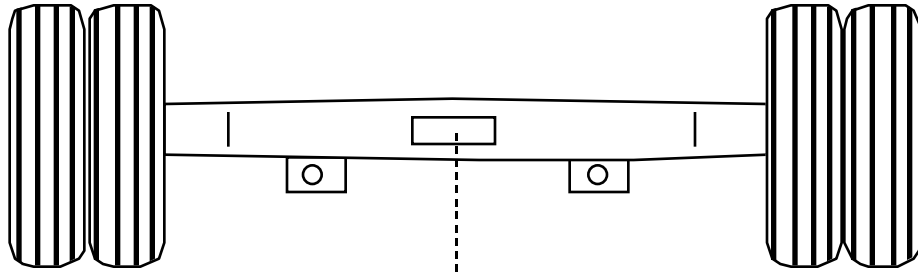
**⚠ WARNING** SAFETY GLASSES SHOULD BE WORN AT ALL TIMES WHEN ASSEMBLING OR DISASSEMBLING AXLES AND THEIR COMPONENTS.

**⚠ WARNING** A SERIOUS OR FATAL INJURY CAN OCCUR...  
IF YOU LACK PROPER TRAINING  
IF YOU FAIL TO FOLLOW PROPER PROCEDURES  
IF YOU DO NOT USE PROPER TOOLS AND SAFETY EQUIPMENT

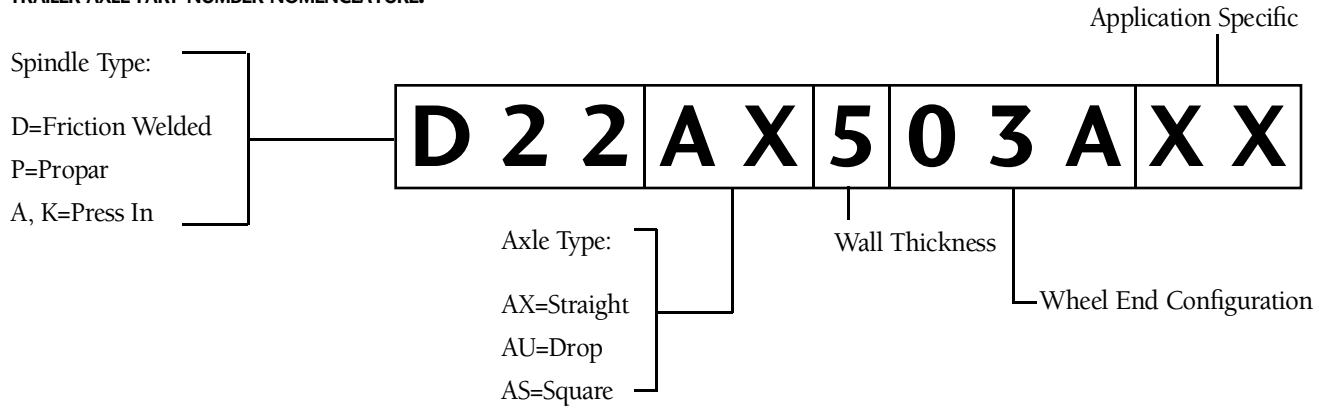
IF YOU ASSEMBLE AXLE COMPONENTS IMPROPERLY  
IF YOU USE INCOMPATIBLE AXLE COMPONENTS  
IF YOU USE AXLES OR AXLE COMPONENTS IN A  
NON-APPROVED APPLICATION

**⚠ WARNING** THIS MANUAL CONTAINS DETAILED SAFETY INSTRUCTIONS. READ, UNDERSTAND AND FOLLOW THIS MANUAL.  
GET PROPER TRAINING  
LEARN AND FOLLOW SAFE OPERATING PROCEDURES  
USE PROPER TOOLS AND SAFETY EQUIPMENT  
USE PROPER COMPONENTS THAT ARE IN GOOD CONDITION

# AXLE IDENTIFICATION



## TRAILER AXLE PART NUMBER NOMENCLATURE:



### AXLE MODEL:

(/NOMINALCAPACITY/BEARING COMBINATION/SPINDLE TYPE)

- A10 / 10000# / 28995 25580 / Pressed-In Spindle (Replaced by D10 Model)
- D10 / 10000# / 28995 25580 / Friction Welded Spindle
- A13 / 13000# / 567 528 / Pressed-In Spindle (Replaced by D14 Model)
- K14 / 15000# / 567 528 / Pressed-In Spindle (Replaced by D14 Model)
- D14 / 15000# / 567 528 / Friction Welded Spindle
- K21 / 20000# / 663 HM-212049 / Pressed-In Spindle
- D21 / 20000# / 663 HM-212049 / Friction Welded Spindle
- K22 / 22500# / HM-218248 HM-212049 / Pressed-In Spindle
- D22 / 22500# / HM-218248 HM-212049 / Friction Welded Spindle
- P22 / 22500# / HM-518445 HM-518445 / Friction Welded Spindle
- K25 / 25000# / 749 643 / Pressed-In Spindle (Obsolete)
- K30 / 30000# / 769 740 / Pressed-In Spindle
- A45 / 45000# / 787 6580 / Integral Spindle
- A65 / 65000# / 896 6580 / Integral Spindle

### AXLE TYPE:

- AX Straight Tube Axle Assembly
- AU Bent Tube Axle Assembly
- AS Square Tube Axle Assembly

### WALL THICKNESS:

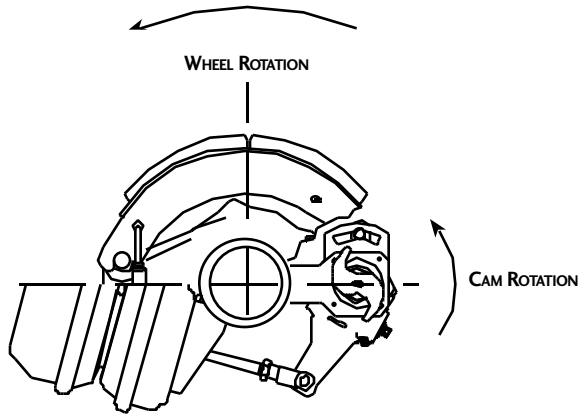
- 5 = 7/16" Nominal Wall Thickness
- 6 = 5/8" Nominal Wall Thickness
- 7 = 3/4" Nominal Wall Thickness

### WHEEL END CONFIGURATION:

- 00= W/ Spiders or Flanges, No Brakes, Hubs or Drums
- 01=W/ Brakes, Hubs and Drums
- 02= W/ Spiders or Flanges and Hubs & Drums No Brakes
- 03= W/ Brakes, No Hubs and Drums
- 04= W/ Hubs, No Spiders, Flanges or Brakes
- 05= No Spiders or Flanges, No Brakes, Hubs or Drums

# AXLE INSTALLATION

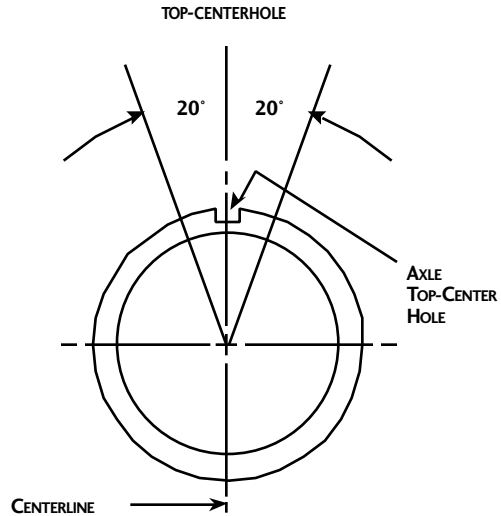
To assure safe operation and maximum durability on parts such as brake linings and tires, it is necessary to position and install the axle properly. It is recommended that the axle assembly be installed so the cams rotate in the same direction as the wheels.



CAM AND WHEELS ROTATE IN THE SAME DIRECTION

Installation in which the camshaft rotation is opposite that of wheel rotation could cause noisy brakes, chatter, and wheel "hop." With this in mind, the axle should be ordered with the placement of air chamber and slack adjuster assemblies that will ensure the correct directional rotation of the cams when the axle is installed.

Unless otherwise specified by the customer, Spicer Trailer Axles are manufactured without camber. If the axle is cambered, the top dead center of the axle will have a small die mark on each end of the axle close to the inboard side of the brake spider.



## AXLE REPAIR

**⚠ WARNING** ANY AXLE FOUND WITH CRACKS SHOULD NOT BE REPAIRED, BUT REPLACED IMMEDIATELY. REPAIR WELDING CAN BE DETRIMENTAL TO THE STRUCTURAL INTEGRITY OF THE AXLE BEAM, WHERE THE BENEFIT OF THE ORIGINAL TUBE HEAT TREATMENT MAY BE NULLIFIED BY THE WELDING. AN AXLE SHAFT WEAKENED BY WELDING COULD FAIL AND CAUSE AN ACCIDENT WHICH COULD RESULT IN SERIOUS INJURY OR DEATH.

**⚠ NOTE** CAMBERED AXLES MUST BE INSTALLED WITH THE DIE MARKS IN THE TOP POSITION.

It is the responsibility of the axle installer to adjust the brakes properly. See the recommended adjustment procedure covered in this manual.

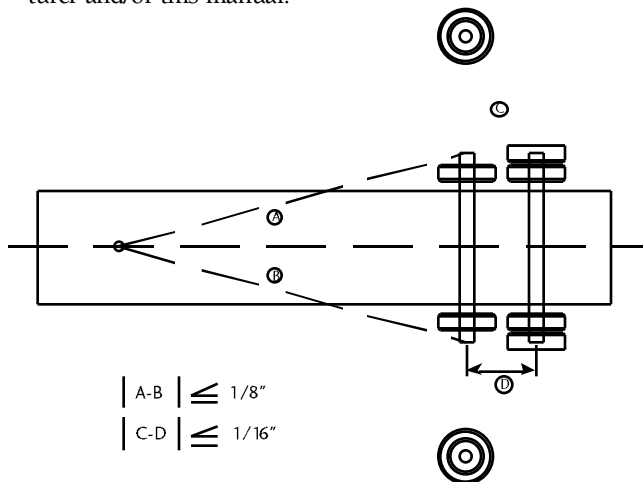
## TRAILER AXLE ALIGNMENT

Proper preparation is a must for effective axle alignment. The vehicle, tools and equipment, and work site must all be appropriate for axle alignment. The process also requires a trained technician who knows the specifications.

### I. VEHICLE PREPARATION

TMC RP 708, TRAILER AXLE ALIGNMENT, addresses all the steps needed to make the trailer ready for alignment.

To review these: 1) Inspect the suspension and the axles for any obvious damage; 2) Tighten, repair or replace - as needed - any parts that do not meet suspension or axle manufacturer criteria for serviceability; 3) Check tires for proper inflation and matching diameters; 4) Park the trailer on a smooth and level pad with the parking brakes released. Note: After backing the trailer in, pull it forward 10 feet to gentle stop. This will allow suspension parts to settle in a “forward running” position. Use wheel chocks to prevent injury due to accidental movement of the trailer; 5) With the brakes still released, adjust the height control valve for the proper setting and the upper coupler to the proper height by raising or lowering the landing gear legs; 6) DO NOT proceed unless the wheel bearing end play is known to be in adjustment per TMC, the bearing manufacturer and/or this manual.



### II. SPECIFICATIONS

Axle alignment specifications may be stated in inches, degrees, minutes of angle (MOA or 1/60th of a degree),

or mm/M. Each format can produce equivalent results. Spicer Trailer Axles are built to less than +/- 2.5 MOA run out at each spindle.

### TOE-IN TOE-OUT:

Installed axles should measure no more than 8 MOA toe-in and 4 MOA toe-out.

**ALIGNMENT:** Axles should be adjusted to an alignment of no more than 5 MOA scrub with the true center of the trailer frame if it is a single axle. If the trailer has multiple axles, each axle should be adjusted to not more than 2.5 MOA scrub relative to the front (or reference) axle. (This adjustment was previously stated as a difference of not more than 1/16" between the right and left centers of adjacent axles.)

**CAMBER:** Typical trailer axles exhibit 23-29 MOA of TOTAL camber change from an off-ground free state to a fully loaded condition. Cambered axles are engineered to flex to a straight beam under load. New Spicer Trailer Axles may be cambered - by special order - with 33 MOA of positive camber. This allows the vertical axis through the tire to return to near “plumb” condition when loaded.

### III. ADJUSTMENTS

All fasteners should be loosened prior to measurements and adjustments. This reduces disturbances to the measuring equipment. All adjustments to axle alignment should be made by first moving the axle toward the rear of the trailer — past the intended point. The axle should then be adjusted forward to intended mark. This step assures that any free motion in the system is placed in a “draft” condition.

A repeated difficulty in adjusting the axle to the desired reading is most often due to a loose wheel bearing, badly worn suspension component, or a combination.

**⚠ WARNING NEVER BEND THE AXLE - BY ANY MEANS - IN ORDER TO CORRECT ANY ALIGNMENT CONDITION! THIS COULD WEAKEN THE AXLE AND CAUSE AXLE FAILURE WHICH COULD RESULT IN SERIOUS INJURY OR DEATH.**

# GENERAL WELDING RECOMMENDATIONS

In welding suspension component parts to the Spicer Trailer Axle, extreme care must be exercised to obtain their correct location and to ensure the spring seated load bearing surfaces are parallel to each other. Any welding of additional attachments to the axle should be approved by the Spicer Trailer Product Engineering Department to maintain warranty coverage.

It is necessary when welding to avoid the high stress areas on the tube top (compression zone) and tube bottom (tension zone). All welds should be made as close to the horizontal centerline as possible. When the axle tube is subjected to the heat from welding and then rapid cooling, the material adjacent to the weld loses its desirable ductile properties and becomes brittle. If this condition exists in the high stress areas under maximum load conditions, the life of the axle will be greatly reduced and premature fatigue failure can occur. Recommended locations for the welds are shown below.

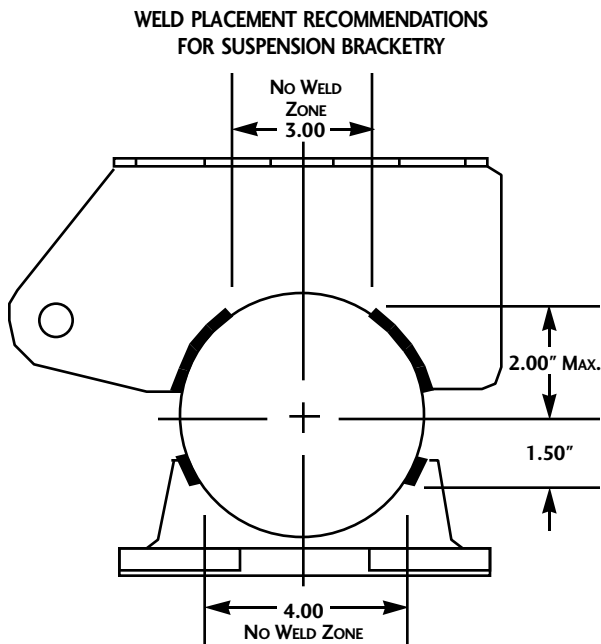


FIG. 1

The welding rods should conform to AWS (American Welding Society), grade E-7018 (Oven-Dried) or comparable. Recommended rod size is 5/32" at voltage and amperage recommended by the electrode manufacturer. For maximum strength, a three-pass weld should be used.

The arc should not be broken at the end of each pass and the corners should be wrapped. The electrode should be backed up to fill in the fillet crater at the end of each pass. Thoroughly clean the weld between each pass.

**⚠ CAUTION DO NOT BRING AXLES IN FROM NONHEATED STORAGE AND WELD WHILE COLD.**

**⚠ CAUTION TO PROVIDE OPTIMUM SUSPENSION-TO-TUBE WELDS, PREHEATING IS RECOMMENDED. PREHEATING WILL MINIMIZE LOSS OF THE DUCTILE PROPERTIES IN THE WELD AREA BY SLOWING THE RATE OF COOLING, THUS REDUCING THE FORMATION OF AN UNTEMPERED MARTENSITIC GRAIN STRUCTURE ADJACENT TO THE WELD. MARTENSITE, A BRITTLE GRAIN STRUCTURE, IS FORMED BY THE RAPID COOLING OF THE METAL SURROUNDING THE WELD AREA. PREHEAT THE SUSPENSION SEAT WELD AREA TO 500-600 DEG. F WITH A ROSEBUD PRIOR TO WELDING. PREHEAT TEMPERATURE SHOULD BE VERIFIED WITH A TEMPERATURE SENSITIVE CRAYON OR OTHER APPROPRIATE MEANS.**

**⚠ CAUTION DO NOT "TEST THE ARC" ON THE AXLE BEAM.**

## HARDWARE FIT

Avoid excessive welding. Fit the seat/hardware as close as possible to the axle. The gap should not exceed 1/8-inch, see Figure 2.

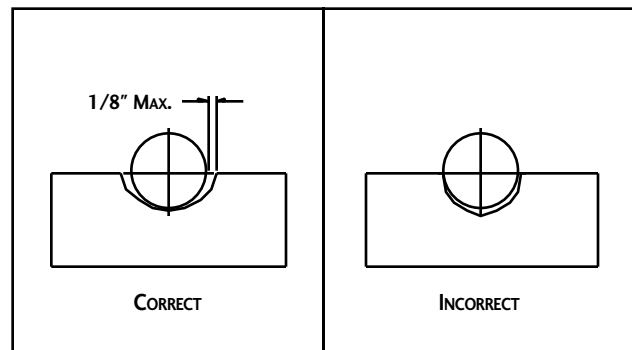


FIG. 2

## WELDING METHODS

Table 1 lists four methods which may be used to weld hardware to trailer axles. The weld tensile strength must be 70,000 psi per AWS specifications.

**TABLE 1**

METHOD FOR WELDING CARBON AND LOW ALLOY STEELS	AWS ELECTRODE CLASSIFICATION	AWS SPEC
Shielded Metal Arc (stick electrodes)	E70XX	A5.1 A5.5
Gas Metal Arc (MIG, solid wire feed)	ER70S-X	A5.18
Gas Tungsten Arc (TIG) has a non-consumable electrode, use stick electrodes	ER70-X	A5.18
Flux Cored Arc (self shielded wire)	E70T-X	A5.20

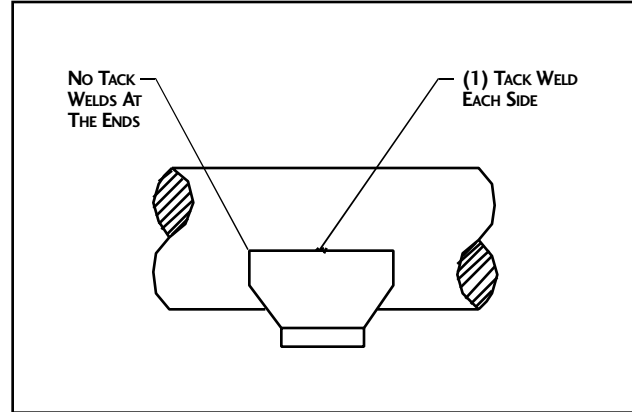
## WELDING HARDWARE TO AXLE

### CAUTION

- THE AXLE INSTALLER SHOULD OBTAIN AND READ A COPY OF THE SUSPENSION MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- ONLY USE OPERATORS CERTIFIED BY AWS (THE AMERICAN WELDING SOCIETY).
- THE AXLE AND ITS MATING BRACKETS MUST BE AT 60°F MINIMUM AND FREE OF MOISTURE, DIRT, SCALE, PAINT AND GREASE. DO NOT BRING IN AXLES FROM NON-HEATED STORAGE AND WELD WHILE COLD.
- PREVENT BEARING DAMAGE. WHEN GROUNDING WELDING EQUIPMENT TO THE AXLE, PREVENT CURRENT FROM PASSING THROUGH THE WHEEL BEARINGS.

### TACK WELDING BRACKET TO AXLE:

- !** **NOTE** DO NOT PLACE TACK WELDS AT WHAT WILL BE THE ENDS OF THE FINAL WELD.
- !** **NOTE** TACK WELD ALL BRACKETS ONTO AXLE BEFORE FUSING THESE TACK WELDS INTO FINAL WELDS.
- !** **NOTE** THOROUGHLY CLEAN THE SLAG FROM THE TACK WELDS BEFORE APPLYING THE FINAL WELDS.



**FIG. 3**

**!** **NOTE** FOR MAXIMUM STRENGTH, A THREE-PASS WELD SHOULD BE USED. ALL FINAL WELDS SHOULD BE MADE IN ONE CONTINUOUS PASS. THE ARC SHOULD NOT BE BROKEN AT THE END OF EACH PASS AND THE CORNERS SHOULD BE WRAPPED.

- !** **NOTE** TO PREVENT AXLE DISTORTION:
- ALTERNATE WELDS BETWEEN THE FRONT AND REAR OF THE BRACKET.
  - ALTERNATE WELDS BETWEEN THE ROADSIDE BRACKET AND CURBSIDE BRACKET.

This welding recommendation pertains to all Spicer tubular axles. Unapproved variation from the procedures listed will void the Axle Warranty and could result in an unsafe weld. In the case of an uncertain circumstance, the Spicer Trailer Products Engineering Department should be contacted.

# WHEEL BEARINGS

## OIL LUBRICATED WHEEL ENDS\*:

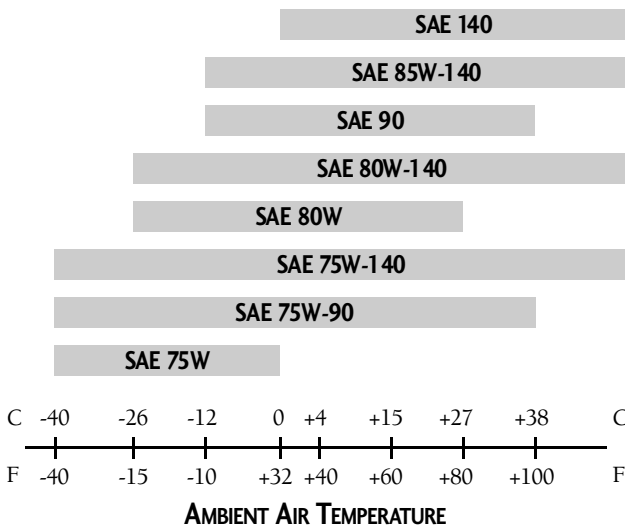
\*Note: For unitized wheel ends, please refer to the Spicer RM™ Service Manual

Oil should be changed at least every 100,000 miles or once a year, and whenever the seals or brakes are replaced. Oil level should be inspected every 1,000 miles. Always allow a few minutes, after adding oil or after vehicle operation, for the oil to settle when establishing the required oil level.

## SUGGESTED OIL PROPERTIES

Petroleum based or synthetic oils that meet or exceed military specification MIL-L-2105D and API (American Petroleum Institute) service classification GL-1 through GL-5 are the minimum requirements for use in Spicer Trailer Axles.

The table below indicates which SAE viscosities are recommended for various temperature ranges the vehicle will encounter.



**WARNING** Do not mix motor oil with EP gear oil, due to possible compatibility problems.

**WARNING** Failure to correctly lubricate bearings - and to maintain proper lubrication - could cause bearing and axle spindle damage, which could result in the wheel locking up or coming off during vehicle operation.

## GREASE LUBRICATED WHEEL ENDS:

Grease should be replaced if contaminated or if the hub is removed from the spindle. For normal service, grease should be replaced annually or at 100,000 mile intervals. For severe or off-highway service, grease should be replaced semi-annually or at 30,000 mile intervals. Bearings should be packed by machine or by hand methods to ensure grease is forced into the cavities between the rollers, cone and cage of the bearings. The wheel and hub cap should be filled with grease when reassembling.

## SUGGESTED GREASE PROPERTIES

The table below indicates the NLGI<sup>†</sup> Grade of grease recommended under normal loading and operating speeds of 100-1000 rpm. For heavy loads and low speeds, the advice of a lubrication engineer should be obtained.

### GREASE GUIDE

SOAP BASED GREASE TYPE	NLGI GREASE GRADE	NOTE
Calcium Complex	#1	Use in extreme cold
Lithium Complex	#2	Normally Preferred
SEMI FLUID SYNTHETIC GREASE TYPE	NLGI GREASE GRADE	NOTE
Mobilith 007 or equivalent	#00	Normally Preferred

<sup>†</sup> National Lubricating Grease Institute


**WARNING** Do not mix lithium, calcium, sodium or barium complex greases due to possible compatibility problems. When changing from one type of grease to another, it is necessary to ensure that all the old grease has been removed.


## WHEEL BEARING ADJUSTMENT PROCEDURE

### DOUBLE NUT ARRANGEMENT

1. Prior to installing any wheel-end fasteners, make sure the spindle area is free of dirt and debris. As well, make sure all nuts and washers are free of dirt. Clean mating surfaces are important for proper wheel end assembly.
2. After properly installing the bearing cones and wheel end seal onto the spindle, and sliding the wheel end onto the spindle, tighten the inner spindle nut with a torque wrench to 150-200 ft. lbs. to set the bearings and wheel end. **Caution: Do not use an air impact wrench to tighten this nut!**
3. Loosen this inner nut to allow the brake drum to rotate freely. Backing off one (1) full turn is recommended.
4. Retighten the inner spindle nut to 50 ft. lbs. by hand using a torque wrench to position the bearings for final adjustment. **Caution: Do not use an air impact wrench to tighten this nut!**
5. Back the inner spindle nut off 1/4 turn.
6. Install the retaining fastener or fasteners onto the spindle according to the fastener used. If washers are used, be sure they are facing in the right direction and are clean. Make sure any washers with dowels fit properly into the mating holes.
7. Install the outer spindle nut. Using a torque wrench, tighten this nut to 300-400 ft.-lbs. Resulting end play should be .001" to .005".

Note: If end play is not .001" to .005", disassemble and repeat this procedure.

 **WARNING** FAILURE TO TORQUE THE OUTER LOCK NUT PROPERLY COULD CAUSE THE WHEEL TO COME OFF DURING VEHICLE OPERATION, WHICH COULD RESULT INPROPERTY DAMAGE, SERIOUS INJURY OR DEATH.

 **WARNING** IF AN EXTERNAL TANG OR SETSCREW TYPE LOCK WASHER IS USED, IT IS IMPORTANT TO REMEMBER TO BEND THE TABS OVER THE OUTER LOCK NUT, OR TO INSTALL THE SET SCREWS IN THE LOCK WASHER, AFTER THE OUTER NUT HAS BEEN TORQUED. FAILURE TO FOLLOW THIS PROCEDURE COULD RESULT IN PROPERTY DAMAGE, SERIOUS INJURY OR DEATH.

Periodic inspection and regular replacement of lubricant is important to obtaining maximum bearing life. Always inspect bearing for damage prior to installation. When installing wheel bearings it is important to ensure both the inside of the wheel hub and bearings are clean. Spicer recommends that seals be replaced when wheels are removed. Extreme care should be taken when reinstalling wheels to prevent damage to the seals.


### SPECIFICATIONS

AXLE MODEL	LOCATION	SPICER BEARING CUP NUMBER	SPICER BEARING CONE NUMBER	INDUSTRY STD. CUP NUMBER	INDUSTRY STD. CUP NUMBER	WIDTH	OUTSIDE DIAMETER	INSIDE BORE
D22	Inner	M10HA102	M10HB100	HM218210	HM218248	1.575"	5.787"	3.542"
D22	Outer	M10HA103	M10HB101	HM212011	HM212049	1.500"	4.813"	2.625"
P22	Inner/Outer	M10HA116	M10HB119	HM518410	HM518445	1.563"	6.000"	3.501"

# RECOMMENDED BRAKE ADJUSTMENT PROCEDURE

 **CAUTION** FAILURE TO PROPERLY ADJUST BRAKES COULD CAUSE REDUCED BRAKING PERFORMANCE.

A. Grease cam bracket and spider fittings prior to brake shoe installation.

 **WARNING** CARE MUST BE EXERCISED TO PREVENT GREASE FROM COMING IN CONTACT WITH BRAKE LININGS WHICH COULD CAUSE A REDUCTION IN BRAKING PERFORMANCE. REDUCED BRAKING PERFORMANCE COULD CAUSE AN ACCIDENT RESULTING IN SERIOUS INJURY OR DEATH.


B. Adjust the slack adjuster until the brake lining comes into contact with the brake drum.

1. For green brakes\* there should be a slight amount of wheel drag at initial adjustment to compensate for any lining irregularities (high spots, etc.).

*\*A "green brake" is an unground, unburnished brake. There is a break-in period where the lining will seat into a normal contact pattern with the drum.*

2. For burnished or broken-in brakes, back off the slack adjuster to achieve .010" clearance between drum and shoe.

C. Apply brakes using normal truck operating pressure. (Average line pressure should be 90 psi.)


 **WARNING** USE OF AIR PRESSURE IN EXCESS OF 130 PSI COULD RESULT IN FAILURE OF THE AIR CHAMBER OR SPRING BRAKE CHAMBER, WHICH COULD RESULT IN SERIOUS INJURY OR DEATH.

1. Check the amount of push rod travel. Maximum should not exceed 2.5" for Type 30 Long Stroke chambers, 2" for Type 30 chambers and 1 3/4" for Type 24 chambers.

a. Optimum pushrod travel on a green brake\* should be under 2".

b. Optimum pushrod travel on a burnished or broken-in brake should be under 1 3/4".

2. Check the angle between the slack adjuster and push rod. With the brakes applied, the angle should be 90 degrees +/- 5 degrees.

 **CAUTION** WHEN AUTOMATIC BRAKE ADJUSTERS ARE USED, IT IS NECESSARY TO FOLLOW THE INSTALLATION AND ADJUSTMENT PROCEDURE RECOMMENDED BY THE AUTOMATIC BRAKE ADJUSTER MANUFACTURER. FAILURE TO FOLLOW THE RECOMMENDED PROCEDURE COULD RESULT IN IMPROPER OPERATION OF THE AUTOMATIC SLACK ADJUSTER, RESULTING IN REDUCED BRAKE PERFORMANCE OR PREMATURE LINING WEAR.


3. For burnished brakes, apply pressure to brakes and check for lining to drum contact. Using a .010" feeler gauge, the lining to drum contact should range from 60 to 100% during brake application.

4. Check to ensure the lining is inside the drum during application. More than .060" protruding out of the drum is not recommended.

D. Rapidly release air pressure from the brakes and confirm that all brakes quickly release to the normal relaxed position.

## WARNING

- BRAKELININGS CONTAIN NON-ASBESTOS FIBERS
- BREATHING BRAKE DUST MAY BE HAZARDOUS TO YOUR HEALTH AND MAY CAUSE SERIOUS RESPIRATORY OR OTHER BODILY HARM.
- AVOID CREATING DUST.
- DON'T REMOVE BRAKE DRUM WITHOUT PROPER PROTECTIVE EQUIPMENT.
- DO NOT WORK ON LININGS WITHOUT PROPER PROTECTIVE EQUIPMENT.
- DO NOT REPLACE LININGS WITHOUT PROPER PROTECTIVE EQUIPMENT.
- DON'T ATTEMPT TO SAND, GRIND, CHISEL, FILE, HAMMER OR ALTER BRAKE LININGS IN ANY MANNER WITHOUT PROPER PROTECTIVE EQUIPMENT.
- FOLLOW O.S.H.A. STANDARDS FOR PROPER PROTECTIVE DEVICES TO BE USED WHEN WORKING WITH BRAKE MATERIALS.

 **WARNING** IT IS CRITICAL THAT ANY BRAKE DRUM REACHING MAXIMUM WEAR DIAMETER, AS CAST ON DRUM, BY TURNING, GRINDING, AND/OR WEARING BE CONSIDERED UNSAFE AND IMMEDIATELY REPLACED. IN ORDER TO AVOID SERIOUS INJURY OR DEATH, ANY BRAKE DRUM EXCEEDING THIS DIMENSION IS CONSIDERED A SAFETY HAZARD. IF IN DOUBT, CONTACT THE BRAKE DRUM MANUFACTURER.

# BRAKE DISASSEMBLY/ASSEMBLY

## BRAKE DISASSEMBLY:

1. Release brakes and back off slack adjuster.
2. Remove slack adjuster lock ring and slack adjuster.
3. Remove brake drum.
4. Remove anchor pins and brake shoes.

**CAUTION** EXCESSIVE POUNDING ON ANCHOR PINS OR CAM ROLLER PINS TO REMOVE OR INSTALL THEM CAN DAMAGE THE PINS AND CAUSE MISALIGNMENT OF THE BRAKE SPIDERS AND BRAKE SHOES. THE USE OF A SOFT HAMMER OR BRASS DRIFT IS RECOMMENDED TO REMOVE OR INSTALL THE ANCHOR PINS IF NECESSARY.

5. Remove brake return springs.
6. Remove camshaft lock ring, spacer washer, and cam shaft.
7. Remove cam roller and shaft (in the case of the cast shoe, remove roller shaft set screw and roller assembly) and anchor pin bushing from shoes.
8. Remove anchor pin bushings, camshaft bushing and seals from spider.

## BRAKE ASSEMBLY

1. Install new anchor pin bushings, camshaft bushing and camshaft seals into the spider.

**WARNING** WHEN INSTALLING CAMSHAFT SEALS, THE SEAL ON THE SLACK ADJUSTER SIDE SHOULD BE INSTALLED WITH SEAL FACING INTO SPIDER. THIS ALLOWS GREASE TO PURGE OUTSIDE THE BRAKE ASSEMBLY WHEN GREASING THE CAMSHAFT BUSHING. FAILURE TO FOLLOW THIS PROCEDURE COULD CAUSE GREASE TO COME INTO CONTACT WITH BRAKE LININGS, CAUSING BRAKE FAILURE.

2. Install cam roller assemblies onto the brake shoes.
3. Install the camshaft into the spider. Install spacer washer and lock ring on cam before sliding the cam through the camshaft support bracket. Install the slack adjuster and the lock ring.

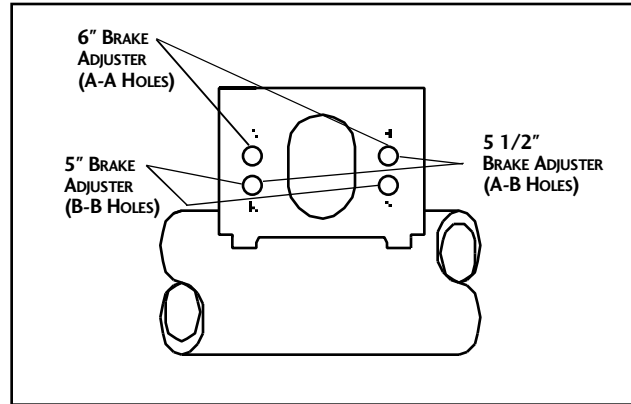


FIG. 4

**WARNING** WHEN REASSEMBLING BRAKES, SPICER TRAILER PRODUCTS RECOMMENDS THAT THE BRAKE RETURN SPRINGS BE REPLACED WITH NEW SPRINGS TO ASSURE PROPER OPERATION OF THE BRAKE.

4. Install the brake return springs on the brake shoes.
5. Position brake shoes on the spider and insert the anchor pins.
6. If air brake chambers are replaced, the correct mounting holes must be used to correspond to brake adjuster length (See Fig.4).
7. Connect slack adjuster to brake chamber push rod.
8. Adjust brakes as outlined in brake adjustment procedures.

**NOTE** TO ENSURE BRAKES MEET F.M.V.S.S. 121 PERFORMANCE REQUIREMENTS, SPICER TRAILER PRODUCTS RECOMMENDS THAT ONLY ORIGINAL EQUIPMENT BRAKE COMPONENTS BE USED.

Any questions or comments on the above procedure should be directed to the Spicer Trailer Engineering Department.

# WELDING ABS WHEEL SPEED SENSOR BLOCKS

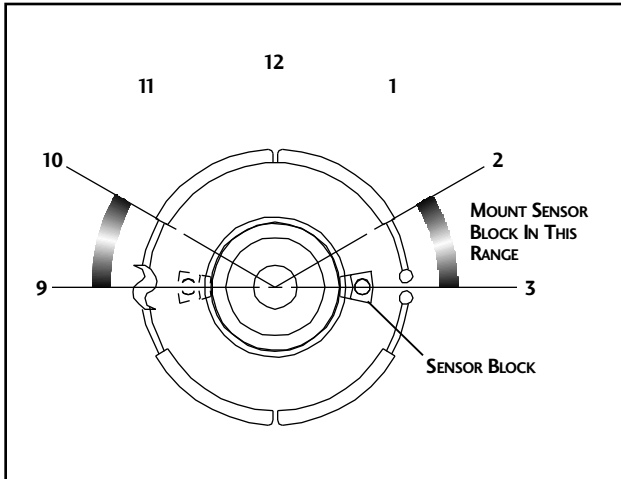


FIG. 5

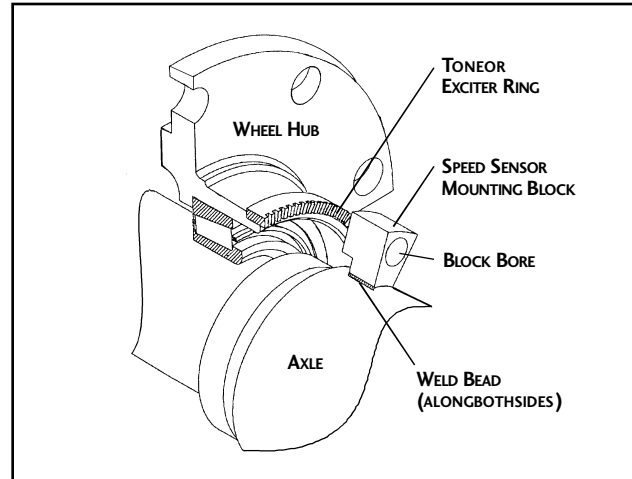


FIG. 6

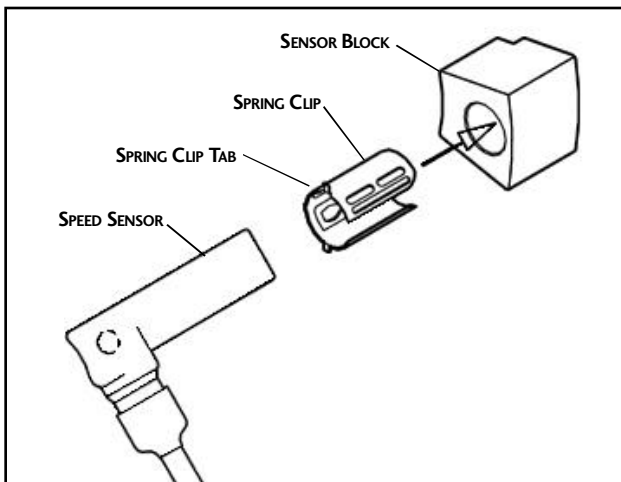


FIG. 7

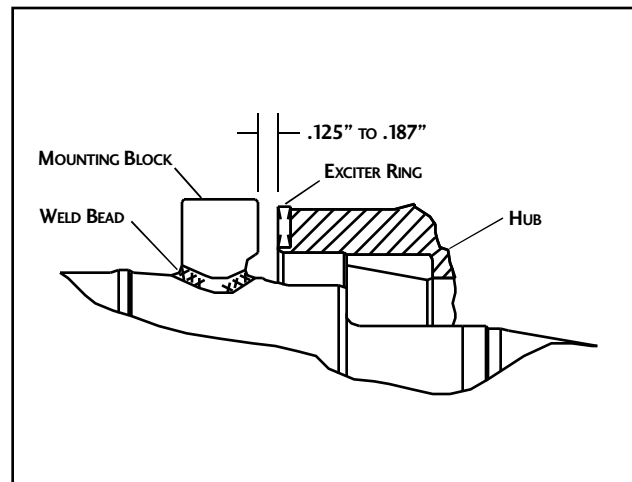


FIG. 8

Correct installation of the speed sensor blocks is extremely important for proper operation of the AntiLock system. Use electric welding equipment only to install the blocks.

1. Properly support the trailer axle using jack stands. Be sure to provide proper clearance to be able to weld the sensor block on the axle near the tone (exciter) ring.
2. With the hub in place, locate the sensor mounting block at the 9 or 3 o'clock position on the axle spindle to lessen the effect from axle flexure due to loading. See Figure 5. Manually hold the sensor block in place and scribe its location on the axle spindle. See Fig. 6 & 8.

Important: the distance of the sensor block from the face of the tone ring "teeth" must be between .125" to .187". See Fig. 8.

3. Remove the hub and bearing assembly and brake assembly from the axle spindle. Clean all oil or grease from the axle spindle.
4. Install the sensor block on the fixture tool and attach the fixture tool to the axle spindle.
5. Adjust the position of the fixture tool as necessary to align the sensor block to the scribed position in Step 2 and tighten in place.
6. Weld the sensor block to the spindle axle. Weld along both sides of the block. See Fig. 6.
7. Remove the fixture tool and let the sensor block cool. After cool down, install the sensor spring clip and sensor as illustrated in Fig. 7.

# TORQUE SPECIFICATIONS

## FASTENER SPECIFICATIONS

PART NAME	SIZE & THREAD	TORQUE
Spindle Outer Nut	2 5/8 - 16 UN	250-400 ft.-lbs.
Cam Brackets	5/16 - 18 Self-tapping	175-225 in.-lbs.
Air Chamber Mounting Bolts	5/8 - 11 UNC	100-115 ft.-lbs.
Dust Shield Mounting	Self-tapping	180-200 in.-lbs.
Brake Lining To Table	Brass Screw 3/8 - 24 UNF	100-150 in.-lbs.
Hub Cap to Hub	1/14 - 20 UNC 5/16 - 18 UNC	96-144 in.-lbs. 144-216 in.-lbs.
Wheel Stud Backnut	3/4 - 16 UNF 7/8 - 14 UNF 1 - 14 UNF	175-200 ft.-lbs. 180-250 ft.-lbs. 200-300 ft.-lbs.
Haldex ABA Control Arm Nut	7/16 - 14 UN	40-50 ft.-lbs.

## SUGGESTED PREVENTATIVE MAINTENANCE

### EVERY 1,000 MILES:

- Check oil level in wheel hub and inspect wheel for leaks.

### 15,000 MILES OR MINIMUM OF TWICE A YEAR:

- Check brake adjustment.
- Repack wheel bearings (grease application).

### 25,000 TO 30,000 MILES

- Check lining wear and estimate replacement time. Replace with new shoes or reline when thickness of lining is 1/4" at thinnest point, or 1/16" above rivet or bolt head. Replace any cracked, broken or oil-soaked linings immediately.
- Inspect camshaft, camshaft spider bushing, and camshaft support bracket bushing for any signs of wear.
- Lubricate camshaft bushings.
- Inspect brake drums for heat checks, grooves, hot spots, glazing, cracks, and out of round.

### 100,000 MILES, ONCE A YEAR, OR AT BRAKE RELINE:

- Replace wheel bearing lubricating oil (if applicable).
- Check brake air chambers and slack adjusters.
- Inspect brake rollers, roller shafts, anchor pins and bushings and replace if necessary.
- Lubricate brake adjusters.
- Check shoes for bent shoe ribs, cracks in shoe table welds or ribs, and elongated rivet holes. Replace shoes if any of these conditions exist.



**Division Office**  
Spicer Trailer Products Division  
Dana Corporation  
2424 W. State St.  
P.O. Box 2527  
Fort Wayne, IN 46801-2527  
Phone: 219-481-3441  
Fax: 219-481-3418

**Axle Manufacturing Facility**  
Spicer Trailer Products Division  
Dana Corporation  
3000 Selma Highway  
Montgomery, AL 36108-5099  
Phone: 334-286-7000  
Fax: 334-286-7047

**Axle Manufacturing Facility**  
Dana Canada Inc.  
120 Welham Road  
Barrie, Ontario, Canada L4M5M4  
Phone: 705-737-2300  
Fax: 705-737-2318

**Spicer Support Line**  
800-666-8688

**URL: [www.dana.com](http://www.dana.com)**