HARSCO RAIL

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SERVICE BULLETIN

MAINTENANCE OF WAY EQUIPMENT

DATE: 5-2012 **BULLETIN NO:** 12-008

TITLE: Axle Bearing End Cap and Axle Bearing Inspection

RATING:

- [X] **DIRECTIVE** (Action Is Required)
- [ ] **ALERT** (Potential Problem)
- [ ] **INFORMATION** (Action Is Optional)
- [ ] **PRODUCT IMPROVEMENT** (Enhance Product)

PRODUCT SERIES / MODEL: PGM48 Series Rail Grinders, #1 through #14

SERIAL NO: 152597, 152598, 152599, 152750, 152751, 152752, 152912, 152913, 152914, 153106, 153107, 153108, 153190, 153191, 153192, 153329, 153330, 153331, 153332, 153333, 153334, 153335, 153336, 153337, 153338, 153339, 153340, 153341, 153342, 153343, 153344, 153345, 153346, 153347, 153348, 153349, 153350, 153351, 153352, 153353, 153354, 153355

SUMMARY: Harsco Rail has been made aware of a potential problem involving the possibility of loosening and / or loss of the axle bearing end caps on the PGM48 Rail Grinders. The loosening and / or loss of the axle bearing end caps may have been caused by incorrect removal and / or installation procedures of the end cap. Axle bearing failure could result if incorrect procedures were used to remove and / or install the end cap.

OPERATIONAL IMPACT: Incorrect procedures used to remove and / or install the end cap will result in axle bearing failure. The failure of an axle bearing will result in the inability to track travel the rail grinder either under its own power or by towing.

ACTION: When performing any work on railroad wheels, axles and bearings, always follow railroad and manufactures rules and guidelines. Follow the instructions in this Service Bulletin to inspect all axle bearing end caps on the rail grinding consist for security. Visually inspect all axle bearings for damage. Record the date and indicate that every bearing was inspected using the attached inspection form.

CONTACT: Harsco Rail Service Department
Harsco Rail, Columbia, SC.
803.822.9160

Safety Information

WARNING

- **FOLLOW APPLICABLE RAILROAD LOCKOUT - TAGOUT PROCEDURE TO REMOVE MACHINE FROM ENERGY SOURCE.**
- **OBSERVE AND FOLLOW ALL RAILROAD SAFETY RULES AND REGULATIONS.**
- **KNOW POSITIONS AND FUNCTIONS OF ALL CONTROLS BEFORE ATTEMPTING TO OPERATE THIS RAIL GRINDER.**
- **THIS RAIL GRINDER IS DESIGNED WITH YOUR SAFETY IN MIND. DO NOT DISCONNECT AND/OR ATTEMPT TO OVERRIDE SAFETY FEATURES.**

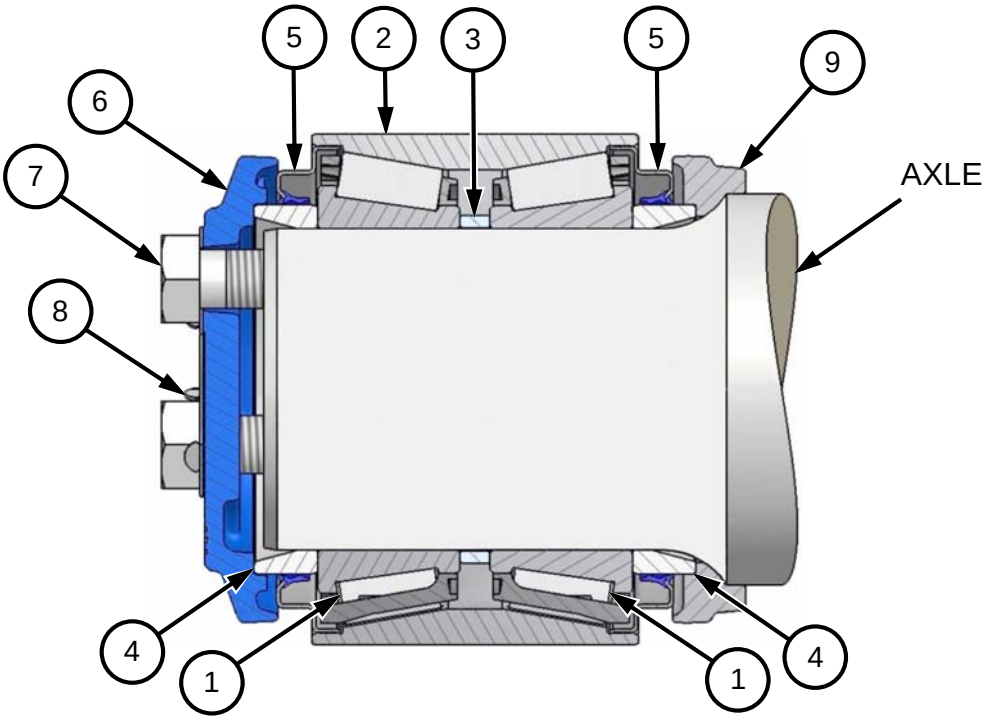
FAILURE TO HEED THESE WARNINGS COULD RESULT IN SEVERE BODILY INJURY.

1.1 Axle Bearing Components - See Figure 1

The following axle bearing components are illustrated in Figure 1 for reference.

(1) Cone Assembly (Cone, Cage and Rollers)
(2) Cup
(3) Spacer
(4) Wear Ring
(5) Grease Seal
(6) Bearing End Cap
(7) Axle Cap Screw
(8) Locking Plate
(9) Backing Ring

FIGURE 1
AXLE BEARING ON AXLE



1.2 Raising Car for Inspecting Axle Bearings and End Caps - See Figure 2

WARNING

- **CHOCK ALL WHEELS ON THE RAIL GRINDING CONSIST. STOP ENGINES AND TURN BATTERY SWITCHES OFF.**
- **JACKS MUST BE RATED TO LIFT THE WEIGHT OF THE CAR. JACK ONLY ON DESIGNATED JACKING POINTS.**
- **DO NOT SUPPORT THE CAR WITH ONLY THE JACKS. PROVISIONS MUST BE MADE SO JACK STANDS OR BLOCKS CAN BE PLACED UNDER THE CAR'S FRAME.**
- **WHEN JACKING CAR, ALWAYS FOLLOW APPLICABLE RAILROAD RULES AND REGULATIONS.**
- **FAILURE TO HEED THESE WARNINGS COULD RESULT IN SEVERE BODILY INJURY.**

The rail grinding cars are equipped with designated jacking points (1). The cars can be lifted by jacking on these designated jacking points.

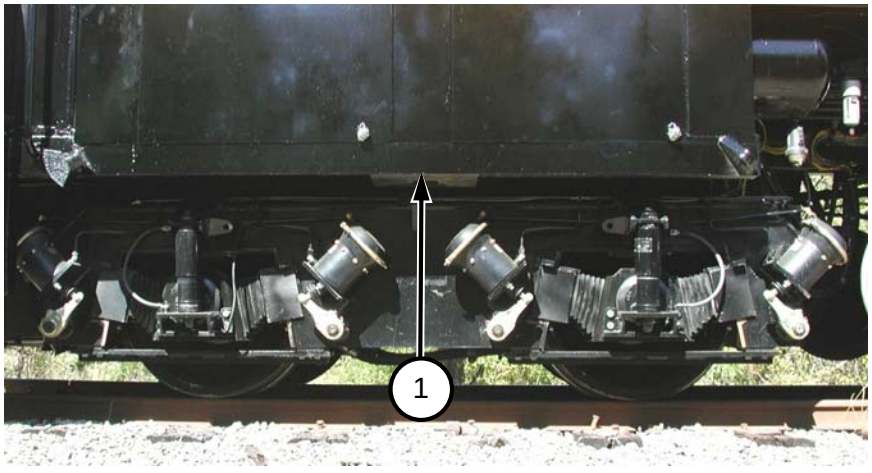
1. When jacking the car, always follow applicable railroad rules and regulations.

2. Locate the machine on a solid, level surface. Chock all wheels on the rail grinding consist. Stop the rail grinder engines. Turn the battery switches off.

3. The jacks used to lift the car must be rated to lift weight of the car. Place the jacks under the designated jacking points (1). Slowly jack the end of the car, from both sides, while visually observing the axle bearing block and chevron springs. Stop raising the car when the load of the car is removed from the rail wheels and the rail wheels are still resting on the rails.

4. Do not support the car with only the jacks. Place jack stands or blocks under the car frame. Lower the car down so it is sitting on the jack stands or blocks. Make sure the car is sitting securely on the jack stands or blocks.

FIGURE 2
JACKING CAR



1.3 Inspecting Axle Bearings and End Caps - See Figures 3 and 4

The axle bearing is designed with a seal, that with proper handling and care will run for years without any substantial grease loss. Therefore, the bearing is not to be lubricated while in service. While grease life can vary with different service conditions such as load, speed, temperature and environment, the grease in this application will normally survive a minimum of 10 years or 1.2 M km (750,000 miles).

While in use, the bearings require no specific service or maintenance. However, care should be taken when performing maintenance in the area of the bearing to avoid damage to the seal or bearing itself. Extreme care must be exercised in the area of the bearing to insure that it does not become overheated. No welding is to be done on any bearing component and proper grounding of the car is necessary to insure no current can flow through the bearing.

During car or bogie maintenance inspections, bearings should be inspected for excessive grease leakage, physical damage, or any unusual conditions.

1. Some grease leakage is normal and comes from the purging of the seal pre-lube and the relieving of internal bearing pressures. This should NOT be wiped away. It will "set-up" and stop further leakage. The apparent amount of grease may be fairly large but this is usually only a small amount of grease mixed with contaminates. If the purging continues to the point of coating a significant amount of the surrounding areas, then Brenco's Service Engineering should be contacted.

2. Visually inspect the bearing for loose or damaged Grease Seals (5). Check for cracked or broken parts. Check for loose Backing Rings (9). Any of these conditions is reason for removing the bearing from service.

3. Visually inspect the Bearing End Cap (6). Inspect for missing Axle Cap Screws (7). Make sure the tabs (A) on the Locking Plate (8) are bent up to prevent the Axle Cap Screws from loosening. If any Axle Cap Screws are missing, they must be replaced. If the tabs on the Locking Plate are broken off or if the Locking Plate is missing, it must be replaced. New Locking Plates are available from Harsco Rail. Order part number 5018335. If a new Locking plate is not available, it is acceptable to drill holes in the Axle Cap Screw heads. Then use proper railroad practices to wire the Axle Cap Screws together to prevent them from loosening.

4. When properly installed and torqued, the Bearing End Cap (6) secures the Cone Assemblies (1), Spacer (3), Wear Rings (4) and Backing Ring (9) in the pressed on position on the axle.

■ **NEVER REMOVE THE BEARING END CAP WITHOUT FIRST REMOVING THE LOAD OF THE CAR FROM THE RAIL WHEEL. JACK THE CAR SO THE LOAD OF THE CAR IS REMOVED FROM THE RAIL WHEELS AND THE RAIL WHEELS ARE STILL RESTING ON THE RAIL. IF THE FULL LOAD OF THE CAR IS ON THE RAIL WHEEL, EVEN A SLIGHT MOVEMENT OF THE CAR CAN CAUSE THE BEARING ASSEMBLY TO MOVE ON THE AXLE RESULTING IN LOSS OF BEARING TOLERANCE. FAILURE TO HEED THIS PRECAUTION COULD RESULT IN BODILY INJURY AND/OR PROPERTY DAMAGE.**

1.3 Inspecting Axle Bearings and End Caps - See Figures 3 and 4

5. See 1.2 - Raising Car for Inspecting Axle Bearings and End Caps. Never remove the bearing end cap without first removing the load of the car from the rail wheels. Jack the car so the load of the car is removed from the rail wheels and the rail wheels are still resting on the rail. If the full load of the car is on the rail wheel, even a slight movement of the car can cause the bearing assembly to move on the axle resulting in loss of bearing tolerance.

6. If a Bearing End Cap (6) has been removed and reinstalled or if there are visual indicators that the bearing may be loose, Harsco Rail recommends that the torque of the Axle Cap Screws (7) be checked.

7. Use the attached PGM48 Series Rail Grinder Axle Bearing Inspection Form to record the inspection of each axle bearing.

FIGURE 3
AXLE BEARING ON AXLE

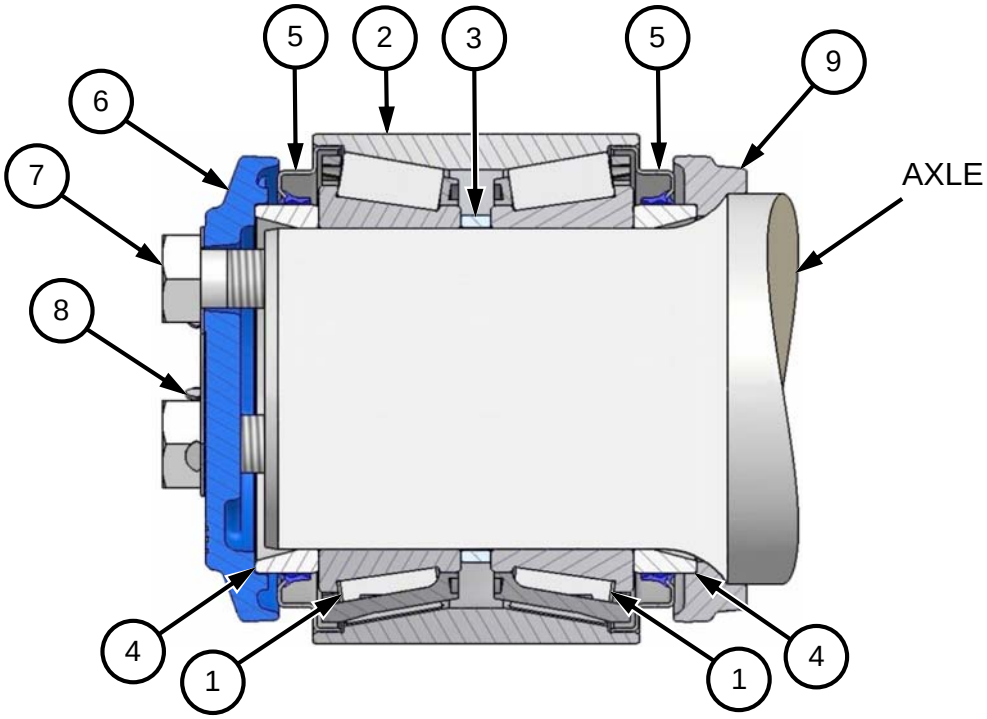
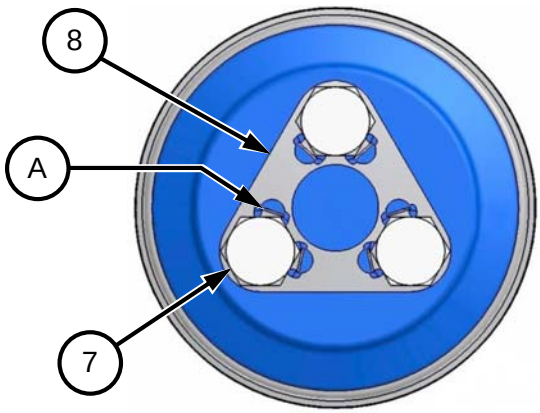


FIGURE 4
AXLE BEARING END CAP



1.4 Checking and Torquing Axle Cap Screws - See Figures 5 and 6

1. It may be necessary to remove the shock absorbers to properly access the Axle Bearing End Cap.

2. The recommended torque for the Axle Cap Screw is:

   1”-8 Axle Cap Screw: 390 ± 16 N-m (290 ± 12 lb-ft).
   M24 Axle Cap Screw: 340 ± 20 N-m (250 ± 15 lb-ft).

3. A bearing is considered loose if the average Axle Cap Screw (7) torque is less than 50% of the initial required torque. The preferred method of checking Axle Cap Screw torque is to use a paint stick to place a mark on the Locking Plate and / or Bearing End Cap and on an adjacent head corner on the Axle Cap Screw. Mark all three Axle Cap Screws in this manner. Being careful not to break the locking tabs (B), bend the locking tabs away from the Axle Cap Screws.

4. One Axle Cap Screw at a time: Back-off the Axle Cap Screw 1/16 turn. Then using a digital (or memorizing needle) torque wrench, retighten the Axle Cap Screw to the mark. Record the torque value for the Axle Cap Screw. Repeat the procedure for number two and number three Axle Cap Screws, returning each to the original position marked with the paint stick and recording the torque value.

5. Add the three recorded torque values together. Divide the added values by three to get an average Axle Cap Screw torque value. If the average Axle Cap Screw torque value is less than 50% of the recommended torque value, the bearing is considered loose, may be at risk, and further inspection per bearing manufacturer recommendations should be performed. If the average Axle Cap Screw torque value is greater than 50% of the recommended torque value, proceed to the next step to properly torque the Axle Cap Screws.

6. If the tabs on the Locking Plate are broken off or if the Locking Plate is missing, it must be replaced. New Locking Plates are available from Harsco Rail. Order part number 5018335. If a new Locking plate is not available, it is acceptable to drill holes in the Axle Cap Screw heads. Then use proper railroad practices to wire the Axle Cap Screws together to prevent them from loosening.

7. If a new Locking Plate is going to be installed, remove the three Axle Cap Screws. Visually inspect the Axle Cap Screws for a lubricant coating on the threads. If no lubricant coating can be detected, dip the threads in SAE 30W mineral oil or light weight grease may also be applied and will serve the same function.

8. Hand-start the Axle Cap Screws into the axle holes. The Axle Cap Screws should rotate freely in the end cap and axle holes. Running a tap through the threads may be necessary to clean or make minor repairs to the threads. Run-up the cap screws to a torque less than the final torque.

9. A calibrated, to national standards, click-type torque wrench should be used to torque the Axle Cap Screws. The torque wrench calibration should be verified as being current prior to use.

1.4 Checking and Torquing Axle Cap Screws - See Figures 5 and 6

10. After running the Axle Cap Screws up snug, torque the Axle Cap Screws in turn; 1, 2, and 3. Tighten each Axle Cap Screw with a slow and steady motion for a comfortable rotation angle.

11. After tightening Axle Cap Screws 2 and 3, Axle Cap Screw 1 may become loose again. Continue around a total of three times. Normally, three passes with a torque wrench is enough to tighten the Axle Cap Screws such that no more motion is possible.

12. If motion continues after pass 3 or 4, this is an indication that the outboard cone is moving. This means the bearing is considered loose, may be at risk, and further inspection per bearing manufacturer recommendations should be performed.

13. After checking and properly torquing the Axle Cap Screws, bend the locking tabs (B) against the sides of the bolt heads. All tabs must be bent and each must rest flat against one of the Axle Cap Screw hexagonal flats.

14. If the tabs on the Locking Plate are broken off or if the Locking Plate is missing, it must be replaced. New Locking Plates are available from Harsco Rail. Order part number 5018335. If a new Locking plate is not available, it is acceptable to drill holes in the Axle Cap Screw heads. Then use proper railroad practices to wire the Axle Cap Screws together to prevent them from loosening.

15. After inspecting all four bearings on the bogie, lower the car. Jack the car up to allow removal of the jack stands or blocks. Remove the jack stands or blocks. Slowly lower the end of the car until its weight is resting on the bogie suspension.

FIGURE 5
AXLE END CAP SHOWN WITH
PAINT STICK MARKS

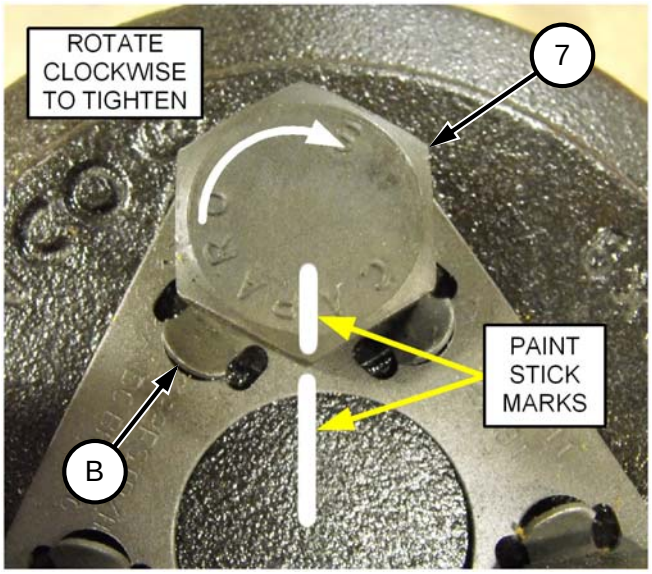
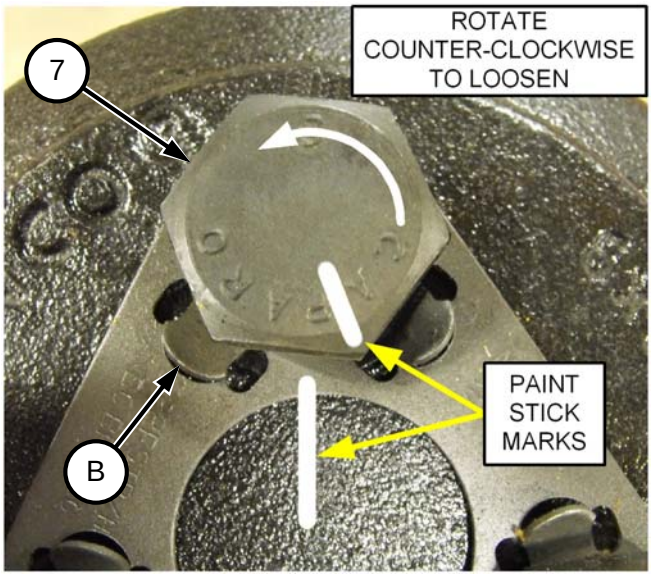


FIGURE 6
AXLE END CAP SHOWN WITH
AXLE CAP SCREW ROTATED 1/16 TURN



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PGM48 Series Rail Grinder Axle Bearing Inspection Form **Page 1 of 4**

Car #1 is the "A" or front end of the consist. Car #3 is the "B" or rear end of the consist. The axles are numbered 1 through 12, starting at the "A" or front end of the consist. Right / left are determined from the operator's position while sitting in the operator's seat in the cab on Car #1. The right side of all cars will be to the operator's right hand side and the left side of all cars will be to the operator's left hand side.

Place a check mark in the box on the form for each axle bearing that is inspected. Enter the Inspection Date and Inspector name in the spaces provided.

PGM48 Series Rail Grinder #1 **Inspection Date:** _____ **Inspector:** _____

	Axle Number	1	2	3	4	5	6	7	8	9	10	11	12
Car #1	Right Side												
SN: 152597	Left Side												
Car #2	Right Side												
SN: 152598	Left Side												
Car #3	Right Side												
SN: 152599	Left Side												

PGM48 Series Rail Grinder #2 **Inspection Date:** _____ **Inspector:** _____

	Axle Number	1	2	3	4	5	6	7	8	9	10	11	12
Car #1	Right Side												
SN: 152750	Left Side												
Car #2	Right Side												
SN: 152751	Left Side												
Car #3	Right Side												
SN: 152752	Left Side												

PGM48 Series Rail Grinder #3 **Inspection Date:** _____ **Inspector:** _____

	Axle Number	1	2	3	4	5	6	7	8	9	10	11	12
Car #1	Right Side												
SN: 152912	Left Side												
Car #2	Right Side												
SN: 152913	Left Side												
Car #3	Right Side												
SN: 152914	Left Side												

PGM48 Series Rail Grinder Axle Bearing Inspection Form **Page 2 of 4**

PGM48 Series Rail Grinder #4 **Inspection Date: _____** **Inspector: _____**

	Axle Number	1	2	3	4	5	6	7	8	9	10	11	12
Car #1	Right Side												
SN: 153106	Left Side												
Car #2	Right Side												
SN: 153107	Left Side												
Car #3	Right Side												
SN: 153108	Left Side												

PGM48 Series Rail Grinder #5 **Inspection Date: _____** **Inspector: _____**

	Axle Number	1	2	3	4	5	6	7	8	9	10	11	12
Car #1	Right Side												
SN: 153190	Left Side												
Car #2	Right Side												
SN: 153191	Left Side												
Car #3	Right Side												
SN: 153192	Left Side												

PGM48 Series Rail Grinder #6 **Inspection Date: _____** **Inspector: _____**

	Axle Number	1	2	3	4	5	6	7	8	9	10	11	12
Car #1	Right Side												
SN: 153329	Left Side												
Car #2	Right Side												
SN: 153330	Left Side												
Car #3	Right Side												
SN: 153331	Left Side												

PGM48 Series Rail Grinder #7 **Inspection Date: _____** **Inspector: _____**

	Axle Number	1	2	3	4	5	6	7	8	9	10	11	12
Car #1	Right Side												
SN: 153332	Left Side												
Car #2	Right Side												
SN: 153333	Left Side												
Car #3	Right Side												
SN: 153334	Left Side												

PGM48 Series Rail Grinder Axle Bearing Inspection Form **Page 3 of 4**

PGM48 Series Rail Grinder #8 **Inspection Date: _____** **Inspector: _____**

	Axle Number	1	2	3	4	5	6	7	8	9	10	11	12
Car #1	Right Side												
SN: 153335	Left Side												
Car #2	Right Side												
SN: 153336	Left Side												
Car #3	Right Side												
SN: 153337	Left Side												

PGM48 Series Rail Grinder #9 **Inspection Date: _____** **Inspector: _____**

	Axle Number	1	2	3	4	5	6	7	8	9	10	11	12
Car #1	Right Side												
SN: 153338	Left Side												
Car #2	Right Side												
SN: 153339	Left Side												
Car #3	Right Side												
SN: 153340	Left Side												

PGM48 Series Rail Grinder #10 **Inspection Date: _____** **Inspector: _____**

	Axle Number	1	2	3	4	5	6	7	8	9	10	11	12
Car #1	Right Side												
SN: 153431	Left Side												
Car #2	Right Side												
SN: 153342	Left Side												
Car #3	Right Side												
SN: 153343	Left Side												

PGM48 Series Rail Grinder #11 **Inspection Date: _____** **Inspector: _____**

	Axle Number	1	2	3	4	5	6	7	8	9	10	11	12
Car #1	Right Side												
SN: 153344	Left Side												
Car #2	Right Side												
SN: 153345	Left Side												
Car #3	Right Side												
SN: 153346	Left Side												

PGM48 Series Rail Grinder Axle Bearing Inspection Form **Page 4 of 4**

PGM48 Series Rail Grinder #12 Inspection Date: _____ Inspector: _____

	Axle Number	1	2	3	4	5	6	7	8	9	10	11	12
Car #1	Right Side												
SN: 153347	Left Side												
Car #2	Right Side												
SN: 153348	Left Side												
Car #3	Right Side												
SN: 153349	Left Side												

PGM48 Series Rail Grinder #13 Inspection Date: _____ Inspector: _____

	Axle Number	1	2	3	4	5	6	7	8	9	10	11	12
Car #1	Right Side												
SN: 153350	Left Side												
Car #2	Right Side												
SN: 153351	Left Side												
Car #3	Right Side												
SN: 153352	Left Side												

PGM48 Series Rail Grinder #14 Inspection Date: _____ Inspector: _____

	Axle Number	1	2	3	4	5	6	7	8	9	10	11	12
Car #1	Right Side												
SN: 153353	Left Side												
Car #2	Right Side												
SN: 153354	Left Side												
Car #3	Right Side												
SN: 153355	Left Side												