Bulletin No.: PIP3720D
Date: Nov-2012

Service Bulletin

PRELIMINARY INFORMATION

Subject: Rules of Thumb American Axle Manufacturing General Information

Models: 1999-2013 GM Light Duty Trucks and Utilities
2003-2010 Hummer H2
2006-2010 Hummer H3
2005-2009 Saab 9-7X

This PI was superseded to update model years. Please discard PIP3720C.

The following diagnosis might be helpful if the vehicle exhibits the symptom(s) described in this PI.

Condition/Concern

Below are ″Rules of Thumb″ supplied by American Axle Manufacturing on common questions on axle setup.

Recommendation/Instructions

1. Maximum pinion shim to be used or stacked behind the pinion is 0.050″. Minimum pinion shim is 0.020″ for an 8.6 axle. When measuring pinion depth, rarely (if at all) should the technician determine that the thickness of the pinion shim would be towards the end of the range (0.024″ or 0.050″) for shims. Nominally, the pinion shim thickness should be in the mid 30's range for the GMT800/820/830 8.6″ axle. If the technician has determined that the pinion shim needed is close to one of the ends of the range, the technician should either compare the measurement to the shim removed or recheck the setup of the measuring tools! (Important rule of thumb to always follow). Nominal pinion shim is 0.029″on 9.5″ axle.
2. Maximum pinion shim for a 10.5″ rear axle is 0.024″. The range for available pinion depth shims for the 10.5″ axle is 0.006″ to 0.024″. When setting pinic depth, start with the shim that wasremoved (if possible) or if not available, start with a 0.016″ shim and perform a pattern check and adjust as necessary based on the pattern result.
3. Backlash should be set to 0.003″ to 0.005″ on a new ring and pinion for any AAM application. As always, the gear pattern should be checked.
4. The ring and pinion can be reused or adjusted if the mileage is less than 500 miles, if not used for towing. If vehicle was used to tow anything, the gear set must be replaced in order to achieve proper setup.
5. A ″roller coaster″ or ″hourglass″ pattern on the bearings may be normal up to 10,000 miles and possibly longer. This is because the bearings have not fully broken in or fully seated themselves completely. Another factor to look at is where the pattern is ″skipping″. If it is on a pinion race, look to see if there is a lube channel in the housing behind the race. If so, this would explain the pattern due to the lack of support behind the race in this area. Again, this would be normal.
6. Generally with a mis-machined housing you may get a heel pattern on both sides of the gear teeth (coast and drive) at build up. This condition applies mostly to older axle assemblies and not so much with the GMT800 platform. Properly diagnosing the pattern will tell the technician on how to correct. Opposing gear contact patterns can generally be corrected with backlash adjustments.
7. Measuring the pinion depth should tell the technician what thickness of shim to use regardless of whether the ring and pinion is a 2-cut or 5-cut. However, a good ″rule of thumb″ for setting up an 8.6″ axle with a 5 cut gear set is to use a 0.035″ pinion shim and set backlash to 0.004″. When using the newer 2 cut gear set also use a 0.035″ pinion shim and still set backlash to 0.004″.
8. When setting up the gear pattern, try to use backlash to adjust the pattern heel to toe. Use the pinion shim to adjust the height of the pattern (from crest to root or top to bottom).
9. Reducing the backlash should move the drive pattern to the toe and coast pattern to the heel. This rule applies even if the pinion shim thickness is not correct (within reason). Pinion shim should be near recommended thickness (# 3 and # 7 from above) for this statement to be accurate.
10. The proper drive pinion bearing pre-load is from 15 - 30 in. lbs with new bearings. With old bearings the rolling torque should be checked prior to

disassembly and reset to only 3 - 5 in. lbs higher than the original rolling torque. Both of these measurements should be taken after bearings have been rotated a minimum of 6 full 360 degree revolutions.

11. To verify actual side bearing pre-load, the total torque to turn after the differential case is installed should increase 5 - 10 in. lbs at the pinion.
12. A new pinion nut must be used whenever the old one is removed which is noted in the service procedures. The new nut makes it easier to locate the pinion crush sleeve during torqueing. A used nut should never be reused.
13. Axle shaft end play spec is 0.012″ per side. Radial (up and down) is 0.002″ - 0.003″.
14. Myth: Synthetic fluid cannot be used in front axles on T-trucks and L-vans. The seals are not compatible and could also cause bearing failure. False -- Synthetic lube can be used in all new AAM axle assemblies.
15. The new pinion seal for the 8.6″ axle assembly is a two piece design. A sleeve is pressed onto the pinion flange and the seal is mounted in the carrier. New parts are offered in a kit.
16. The head bearing (large bearing) is the bearing at the far end of the drive pinion and the tail bearing (small bearing) is the bearing at the spline end of th drive pinion.
17. 5 cut and 2 cut refers to the number of machining operations. On a 5 cut gear set each tooth is made by doing a rough and a finish cut on the ring gear. The drive pinion for the 5 cut gear set has a rough cut and two finish cuts. On a 2 cut gear set each tooth is made with the rough and finish cuts being done all in one cut. The 2 cut teeth on the ring gear appear rectangular and the tooth height is equal from heel to toe. The tooth height for the 5 cut ring gear is greater at the heel vs. the tooth height at the toe. Another way to determine this is by looking at the pinion gear teeth. They will taper in thickness from heel to toe on the 5 cut. The set-up is the same between the two types.

Please follow this diagnostic or repair process thoroughly and complete each step. If the condition exhibited is resolved without completing every step, the remaining steps do not need to be performed.
