Independent Testing of Differentials by:

Summary from NTS (National Technical Systems)-
A group of Eaton's differentials were tested at NTS along with the competitor's differentials. Eaton's differentials were used as a baseline for testing. All differentials were held to the same parameters. According to the test results, the Eaton differentials outperformed the competitor's differentials nearly two to one.

The parameters were as follows:
- The sump temperature was held at180°F ±10°F
- The ring gear torque was at 3200 Ft-Lbs.
- The nominal ring gear speed was 80 RPM

The following test was performed on the axles:

1) Perform a Break-In procedure according to Tables 1 and 2
2) Perform a Bias Test. The bias test torque is performed according to Table 2, but the bias needs to be performed only once on the left side and once on the right side. The bias test has torque removed from one side with the equal amount applied to the opposite side. This is done until the axle cannot keep equal RPM on the output of the axle.
3) Perform the Durability Test using the RPM schedule presented in Table 1, but using only the 100% torque value of Table 2. This is to be accomplished 300 times.
4) Perform another Bias test.
5) Perform another Durability Test.
6) Perform another Bias Test.

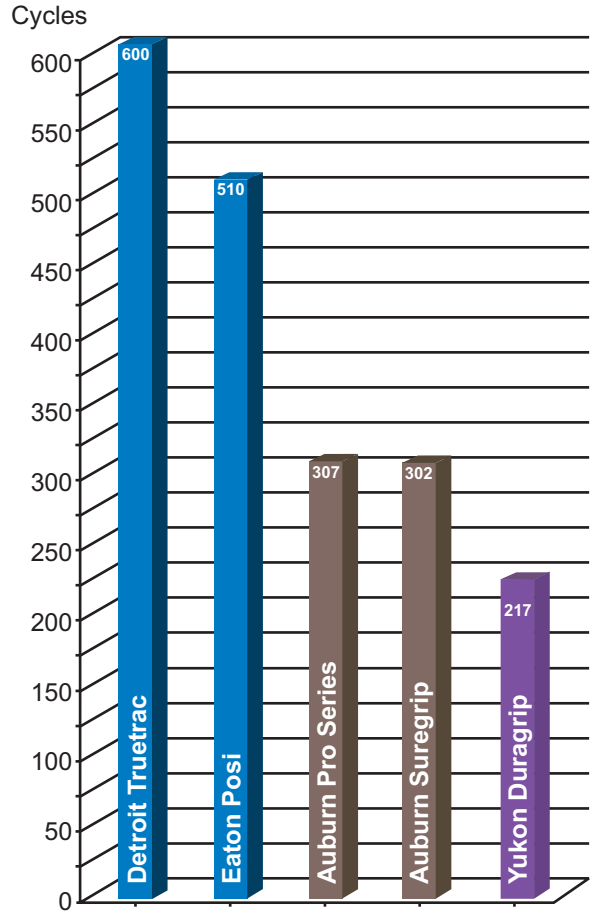
Table 1

Axle Speed		Time
Left	Right	
(RPM)	(RPM)	Seconds
80	80	30
75	85	30
80	80	30
85	75	30
The four steps consist of one cycle and the ramp times to achieve the rpm do not include the test time required.		

Table 2

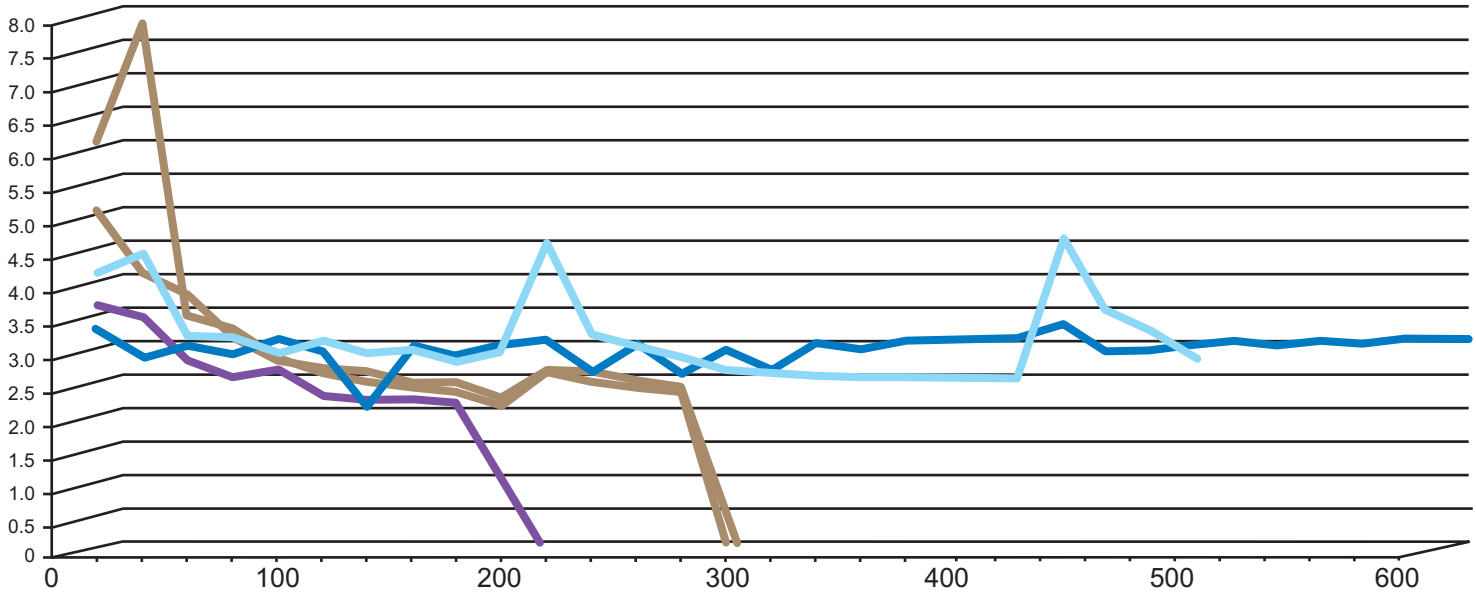
	Ring Gear Torque		Bias Test
Percentage	(Ft-Lbs)		Cycles
20	640		10
40	1280		10
60	1920		10
80	2560		10
100	3200		10
The durability test cycling has 300 cycles at 100% Ring Gear Torque to complete its requirement.			

Durability



- Detroit Truetrac: Still Performing After 400 Cycles
- Eaton Posi: Still Performing After 400 Cycles
- Auburn Pro Series: Failed @ 307 Cycles
- Auburn Suregrip: Failed @ 302 Cycles
- Yukon Duragrip: Failed @ 217 Cycles

Torque Bias



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