SUBJECT: Allison Transmission 6000 Series™ Dyno Testing Process

MODELS AFFECTED: 6000 Series

Introduction

The Allison 6000 Series Dyno Test Process is designed to ensure that transmissions perform reliably following a complete overhaul. This procedure outlines the necessary steps for preparing, testing, and verifying the transmission on a dynamometer; focusing on oil fill, warm-up, and operational checks. By following these guidelines, technicians can confirm that all transmission functions are restored and that the unit is ready to be returned to service.

Oil Fill Process

Initial Oil Fill

Before running the transmission, fill the transmission until the oil level in the sight glass is 90% full.

Warm-Up/Oil Priming

1. Start the transmission in **N** (Neutral). Ramp input speed to 600 rpm (± 20 rpm), and set light output torque to ≤ 35 N·m (50 ft lbs) to ensure the output is stopped.
2. Remove the "full" plug from the transmission rear cover. Fill or drain oil until it lightly comes out of the full plug, then reinstall the plug.
3. Begin with no torque load. Gradually shift through all forward and reverse ranges, include converter and lockup for all forward ranges, holding each for at least 15 seconds. Finish by returning to **N** (Neutral).

NOTE: The goal is to ensure that oil has made it to all clutches and transmission lube paths, getting into all converter and lockup ranges ensures that all paths have been filled.

4. With the transmission still running at 600 rpm (± 20 rpm), apply 35 N·m (50 ft lbs) of torque to the output to ensure the output shaft is stopped. Allow the transmission oil level to settle for two minutes.

5. Once the oil level has settled, verify that the oil level is within the bottom half of the sight glass. If not, drain or add oil as needed to achieve the correct condition.
6. Using normal operational methods, warm the transmission to the customer's optimal operating temperature within the application. Ensure that the temperature is above 60°C (140°F).
7. Allow the transmission oil level to settle for two minutes. Ensure that the oil level is within the top 50%-80% of the sight glass, with the transmission in **N** (Neutral) and output stopped at operating temperature. Light torque may need to be applied to the output.

Set Baseline Main Pressure

NOTE: Temperature, cooler line size, gauge quality, oil used, and test stand variability may influence the test procedure and the resulting readings. Refer to recent tests for the same transmission model to determine whether a reading is out of specification for the test stand, especially if it does not align exactly with the stated specifications.

NOTE: These specifications were developed using Shell Rotella 15w-40 Oil.

1. Start with no output torque load, at the customer's/application's nominal operating temperature (must be above 60°C (140°F)), ramp the transmission to the **5** (Fifth Range) converter and set input speed to 1500 rpm.
2. Record main pressure. If the main pressure is not within the given specification, adjust main pressure regulator shimming. For specific details on the main pressure regulator shimming process, refer to the latest version of the applicable Service Manual.

Input Speed at Test Point (rpm)	1500
Test Point Gear	**5** (Fifth Range) Converter
Main Pressure Specification (psi)	175-200
Recorded Main Pressure	_____

3. Return the transmission to **N** (Neutral) at 600 rpm. If necessary, re-shim the main pressure regulator and retest.

Lube Pressure, Converter Pressure, and Flow No Load Checks

Refer to the Lube and Converter Check and Flows table below to determine the correct converter for the next dyno step.

NOTE: If unsure of the unit configuration, use the Allison HUB™ to search by serial number or consult the parts catalog for guidance.

Tip: Clearly highlight the converter being used before proceeding.

Test Procedure

1. Ensure that the transmission is at nominal operating temperature (above 60°C (140°F)).
2. Ramp the transmission to the **5** (Fifth Range) converter and set input speed to 1500 rpm.

3. Record lube pressure, converter out pressure, and cooler flow points in the table below.

Lube Pressure, Cooler Pressure, and Cooler Flow Checks By Converter Type					
	Specs by Converter				Test Point Recording
	TC-580 and TC-680		TC-682 and TC-683		
Retarder/No Retarder	Retarder	No Retarder	Retarder	No Retarder	
Lube Pressure (psi)	30-50	20-28	20-28	20-28	
Converter Out/ Cooler In Pressure (psi)	24-47	20-33	24-47	20-33	
Converter Out/ Cooler In Flow (GPM)	9.5 minimum	16 minimum	16 minimum	16 minimum	

4. Verify that all recorded values are within specification limits as outlined in the reference tables. If values are not within recommendations, review test procedure and retest. If collected parameters still are not within specification, review the unit to understand if there is an issue.

Lockup Pressure Check

1. Shift the transmission to **5** (Fifth Range). Engage lockup, then ramp transmission to 1500 rpm ± 20.
2. Record lockup pressure in table below. If the lockup pressure is not within the given specification, check solenoid or lockup circuit to determine the issue.

Input Speed at Test Point (rpm)	1500
Test Point Gear	**5** (Fifth Range) Lockup
Lockup Pressure Specification (psi)	170-210 and Main-5
Recorded Lockup Pressure	_____

Neutral and Clutch Operation Checks

All clutch operation checks are to be run at normal customer operating temperature or greater than 60°C (140°F).

Neutral Input Torque Check

1. In **N** (Neutral) range, lightly load the output to prevent output rotation. Set input speed to 1500 rpm and record the input torque reading.

Input Speed at Test Point (rpm)	1500 ± 20
Test Point Gear	**N** (Neutral)
Max Allowable Input Torque	135 N·m (100 lb ft)
Recorded Input Torque	_____

2. If values are not within recommendations, review test procedure and retest. If collected parameters still are not within specification, review unit to understand if there is an issue.

Forward Range Input Torque and Speed Check

1. In **1** (First Range), **4** (Fourth Range), and **5** (Fifth Range) , with no output torque load, set input speed to 2000 rpm ± 20. Ensure that lockup is engaged and record input torque and output speed.
2. In **R** (Reverse) range:

Reverse Range Input Torque/Speed Check Test				
Test Point Range	1st Lockup	4th Lockup	5th Lockup	Reverse
Input Speed Test Point (rpm)	2000 ± 20	2000 ± 20	2000 ± 20	2000 ± 20
Max Input Torque Specification (lb ft)	100	100	100	100
Recorded Input Torque (lb ft)	_____	_____	_____	_____
Output Speed Spec (rpm)	500 ±20	1480 ±20	2000 ±20	388 ±20
Recorded Output Speed (rpm)	_____	_____	_____	_____

3. If values are not within recommendations, review test procedure and retest. If collected parameters still are not within specification, review unit to understand if there is an issue.

Clutch Pressure Check

1. With no output load, set input speed to 1900 rpm ± 20; this speed will be used at all test points. Record the pressure readings of all clutches at the given input speed by shifting the transmission slowly through all converter ranges, and ensure that the transmission achieves lockup in each range. If clutch pressure readings are out of specification, ensure that speeds, temperature, and test parameters are correct. If necessary, retest the point to ensure completeness.
2. **N (Neutral)**

Range	**N** (Neutral)
Engaged Clutch	Splitter Low (C1)
Pressure Specification (psi)	175-200 and Main-10
Recorded Clutch Pressure (psi)	_____

3. **R (Reverse)**

Range	**R** (Reverse)	
Engaged Clutch	Splitter Low (C1)	Reverse (C6)
Pressure Specification (psi)	175-200 and Main-10	175-200 and Main-5
Recorded Clutch Pressure (psi)	_____	_____

4. **First Lockup**

Range	First Lockup		
Engaged Clutch	Splitter Low (C1)	Low (C5)	Lockup
Pressure Specification (psi)	175-200 and Main-10	175-200 and Main-5	175-200 and Main-5
Recorded Clutch Pressure (psi)	_____	_____	_____

5. **Second Lockup**

Range	Second Lockup		
Engaged Clutch	Splitter High (C2)	Low (C5)	Lockup
Pressure Specification (psi)	175-200 and Main-5	175-200 and Main-5	175-200 and Main-5
Recorded Clutch Pressure (psi)	_____	_____	_____

6. **Third Lockup**

Range	Third Lockup		
Engaged Clutch	Splitter Low (C1)	Intermediate (C4)	Lockup
Pressure Specification (psi)	175-200 and Main-10	175-200 and Main-5	175-200 and Main-5
Recorded Clutch Pressure (psi)	_____	_____	_____

7. **Fourth Lockup**

Range	Fourth Lockup		
Engaged Clutch	Splitter High (C2)	Intermediate (C4)	Lockup
Pressure Specification (psi)	175-200 and Main-5	175-200 and Main-5	175-200 and Main-5
Recorded Clutch Pressure (psi)	_____	_____	_____

8. **Fifth Lockup**

Range	Fifth Lockup **NOTE:** Both Rotating Clutches on in this range, acceptable to see lower clutch pressure here vs. other ranges.		
Engaged Clutches	Splitter Low (C1)	High (C3)	Lockup
Pressure Specification (psi)	165-190 and Main-10	165-190 and Main-10	Main-10
Recorded Clutch Pressure (psi)	_____	_____	_____

9. **Sixth Lockup**

Range	Sixth Lockup		
Engaged Clutches	Splitter High (C2)	High (C3)	Lockup
Pressure Specification (psi)	175-200 and Main-5	175-200 and Main-10	175-200 and Main-5
Recorded Clutch Pressure (psi)	_____	_____	_____

10. Slowly return transmission to **N** (Neutral). If any recorded clutch pressures did not meet pressure specification, review the test procedure, and ensure that all parameters were correctly followed.

Transmission External Function Check

Retarder

NOTE: Ensure not to apply retarder for more than 20 seconds. Overheating risks can occur if the retarder is applied for too long.

1. Set the transmission to **5** (Fifth Range), ramp input speed to 1000 rpm. Fully engage retarder.
2. Verify that lube pressure drops, then recovers to at least 18 psi with retarder applied.

Input Speed at Test Point (rpm)	1000
Test Point Gear	**5** (Fifth Range) Converter
Lube Pressure Minimum Specification (psi)	≥18
Recorded Lube Pressure (psi)	_____

3. Verify that input torque rises with the retarder and apply. Disengage retarder, and verify that input torque returns to pretest input.