

NATEF AUTOMOTIVE TASK LIST
AUT 116 - MANUAL TRANSMISSION/AXLE

TERM: _____
INSTRUCTOR: _____

SID: _____
NAME: _____

For every task in Manual Transmission/Axle the following safety requirement must be strictly enforced: Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state and federal safety and environmental regulations.

<u>Task Code</u>	<u>Task</u>	<u>Priority</u>
<u>C. Transmission/Transaxle Diagnosis and Repair</u>		
3.C.1	Inspect, adjust, and reinstall shift linkages, brackets, bushings, cables, pivots, and levers.	P-2
3.C.2	Describe the operational characteristics of an electronically-controlled manual transmission/transaxle.	P-3
3.C.3	Diagnose noise concerns through the application of transmission/transaxle power-flow principles.	P-2
3.C.4.	Diagnose hard shifting and jumping out of gear concerns; determine necessary action.	P-2
3.C.5.	Diagnose transaxle final drive assembly noise and vibration concerns; determine necessary action.	P-3
3.C.6.	Disassemble, inspect clean, and reassemble internal transmission/transaxle components.	P-3
<u>E. Drive Axle Diagnosis and Repair</u>		
<u>E.1 Ring and Pinion Gears and Differential Case Assembly</u>		
3.E.1.1.	Clean and inspect differential housing; check for leaks; inspect housing vent.	P-2
3.E.1.2.	Check and adjust differential housing fluid level.	P-1
3.E.1.3.	Drain and refill differential housing.	P-1
3.E.1.4.	Diagnose noise and vibration concerns; determine necessary action.	P-2
3.E.1.5.	Inspect and replace companion flange and pinion seal; measure companion flange run-out.	P-2
3.E.1.6.	Inspect ring gear and measure runout; determine necessary action.	P-3
3.E.1.7.	Remove, inspect, and reinstall drive pinion and ring gear, spacers, sleeves, and bearings.	P-3
3.E.1.8.	Measure and adjust drive pinion depth.	P-3
3.E.1.9.	Measure and adjust drive pinion bearing preload.	P-3
3.E.1.10.	Measure and adjust side bearing preload and ring and pinion gear total backlash and backlash	

- variation on a differential carrier assembly (threaded cup or shim types). P-3
- 3.E.1.11. Check ring and pinion tooth contact patterns; perform necessary action. P-3
- 3.E.1.12. Disassemble, inspect, measure, and adjust or replace differential pinion gears (spiders), shaft, side gears, side bearings, thrust washers, and case. P-3
- 3.E.1.13. Reassemble and reinstall differential case assembly; measure runout; determine necessary action. P-3

E.2 Limited Slip Differential

- 3.E.2.1 Diagnose noise, slippage, and chatter concerns; determine necessary action. P-3
- 3.E.2.2 Measure rotation torque; determine necessary action. P-3

E.3 Drive Axles

- 3.E.3.1 Inspect and replace drive axle shaft wheel studs. P-1
- 3.E.3.2 Remove and replace drive axle shafts. P-1
- 3.E.3.3 Inspect and replace drive axle shaft seals, bearings, and retainers. P-2
- 3.E.3.4 Measure drive axle flange runout and shaft endplay; determine necessary action. P-2
- 3.E.3.5 Diagnose drive axle shafts, bearings, and seals for noise, vibration, and fluid leakage concerns; determine necessary action. P-2

F. Four-Wheel/All-Wheel Drive Component Diagnosis and Repair

- 3.F.1 Inspect, adjust, and repair shifting controls, (mechanical, electrical, and vacuum), bushings, mounts, levers, and brackets. P-3
- 3.F.2 Inspect front-wheel bearings and locking hubs; perform necessary action. P-3
- 3.F.3 Check for leaks at drive assembly seals; check vents; check lube level. P-3
- 3.F.4 Identify concerns related to variations in tire circumference and/or final drive ratios. P-3
- 3.F.5 Diagnose noise, vibration, and unusual steering concerns; determine necessary action. P-3
- 3.F.6 Diagnose test, adjust, and replace electrical/electronic components of four-wheel drive systems. P-3
- 3.F.7 Disassemble, service and reassemble transfer case and components. P-3