ALL MODELS

American Motors
Chrysler Corp.
Ford Motor Co.
General Motors

LUBRICATION

SERVICE INTERVALS

American Motors – Check fluid level every 5,000 miles.

Chrysler Corp. – Check fluid level every oil change.

Ford Motor Co. – Check fluid level every 5,000 miles.

General Motors – Check fluid level every 12 months or 7,500 miles.

CHECKING FLUID LEVEL

American Motors & General Motors – Check fluid level with engine stopped and fluid at normal operating temperature (about 170°F). Fluid level must be to full mark on dipstick.

Chrysler Corp. – Check fluid level with engine stopped and fluid at ambient temperature (70-80°F). Fluid level must be to "FULL COLD" mark on dipstick.

Ford Motor Co. – With engine running and fluid at normal operating temperature, turn steering wheel all the way from left to right several times, then shut off engine. Fluid level must show between full "COLD" and full "HOT" marks on dipstick. DO NOT overfill.

Recommended Fluid Type

Application	Fluid Type
American Motors	②AMC Power Steering Fluid
Chrysler Corp.	②Power Steering Fluid (2084329)
Ford Motor Co.	Type "F" Auto. Trans. Fluid
General Motors	①Power Steering Fluid (1050017)

① – Dexron type automatic transmission fluid may be used in an emergency.
② – DO NOT use automatic transmission fluid.

REFILLING & BLEEDING SYSTEM

American Motors & General Motors – Turn wheels to full left position and add power steering fluid to cold mark on dipstick. Start engine and run at fast idle, check fluid level and add as necessary to cold mark on dipstick. Bleed system by turning wheel from side to side without hitting stops. Maintain fluid level just above pump housing. Fluid with air in it will have a light tan or red appearance. All air must be eliminated before normal steering action can be obtained. Return wheels to center position and operate engine for another 2-3 minutes. Road test vehicle and recheck fluid level. Level must be at hot mark on dipstick after fluid is at normal operating temperature.

Chrysler Corp. – Fill pump reservoir with power steering fluid, start engine and check for leaks. Bleed system by turning wheels from stop to stop several times. Shut off engine and recheck fluid level.

Ford Motor Co. – Proceed as in *CHECKING FLUID LEVEL*. Turn steering wheel full left and right several times but DO NOT hold in full left or right position. If air is still trapped in system, refer to *PURGING SYSTEM (FORD MOTOR CO. ONLY)*.

PURGING SYSTEM (FORD MOTOR CO. ONLY)

Air trapped in power steering system which causes a whine-type noise between 20-45 MPH on light acceleration, can be removed by using a power steering pump air evacuator assembly (Devac Tool).

Devac System – Fabricate an air evacuator tool as shown in *Fig. 1*. Make sure that fluid level is correct, raise front of vehicle so wheels are off ground and support. Remove coil wire, crank engine and recheck fluid level while turning wheels from side to side. Replace coil wire, insert tool into pump filler and apply vacuum from vacuum pump. DO NOT use engine vacuum. Maintain for 3 minutes with engine idling, recheck fluid level, and apply vacuum again. Cycle steering lock-to-lock every 30 seconds for 5 minutes. Remove tool, check fluid level and add if necessary, lower car.

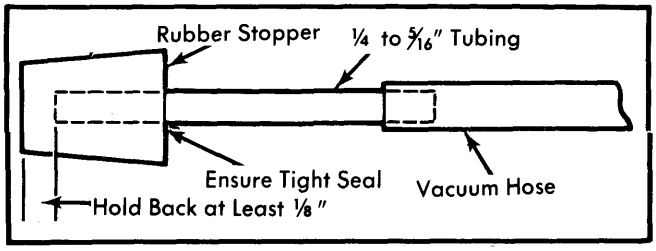

Fig. 1 Air Evacuator Tool

SERVICING

BELT TENSION

Tension (Lbs.) Using Strand Tension Gauge

Application	New Belt	Used Belt
American Motors		
6 Cyl. with A/C		
(3/8" Belt)	65-75	60-70
All Others	125-155	90-115
Chrysler Corp.		
Rear Wheel Drive	120	70
Front Wheel Drive		
1.7L (105")	80	50
2.2L (135")	75	55
2.6L (156")	110	75
Ford Motor Co.		
Ford, Mercury, Lincoln & Mark VI	160-180	140-160
All Others	120-150	90-120
General Motors		
Cadillac		
V6 & Diesel	145	65
6.0L (368") V8	200	90
All Others		
5/16" Belt	80	50
3/8" Belt	140	70
15/32" Belt	165	90
3/8" Cogged Belt	.....	60

ALL MODELS (Cont.)

TROUBLE SHOOTING

RATTLE OR CHUCKLE NOISE

Loose steering gear mountings. Worn steering linkage. Loose pitman shaft. Incorrect overcenter adjustment. Pressure hose touching body or frame.

SQUAWK IN GEAR WHEN TURNING

Worn spool valve damper "O" ring.

CHIRP OR SQUEAL AT FULL WHEEL TRAVEL

Loose drive belt tension.

WHINE OR GROWL NOISES

Low fluid level. Hose restriction or kink. Pressure hose touching body or frame. Worn or damaged pump.

GROANING NOISE

Low fluid level. Air in system. Worn or damaged pump.

POOR STEERING RETURN

Binding in steering column or linkage. Incorrect tire pressure. Incorrect wheel alignment. Power cylinder damaged. Defective spool valve. Steering gear damaged or adjusted too tight. Bent power cylinder rod (non-integral steering only). Hose restriction or kink.

STEERING WANDER

Incorrect tire pressure. Incorrect wheel bearing adjustment. Defective valve body. Incorrect steering gear adjustment. Incorrect wheel alignment. Loose steering gear mountings.

HARD STEERING OR LACK OF ASSIST

Incorrect tire pressure. Loose drive belt tension. Low fluid level. Sticking flow control valve. Low pump pressure. Internal steering gear leakage. Steering column misalignment. Incorrect wheel alignment. Hose restriction or kink.

KICKBACK OR LOOSE STEERING

Air in system. Loose steering gear mountings. Loose flexible coupling. Steering linkage worn. Incorrect wheel bearing adjustment. Worn poppet valve. Excessive overcenter lash. Loose steering gear preload.

STEERING WHEEL JERKS

Low fluid level. Loose drive belt tension. Low pump pressure. Steering linkage hitting chassis or engine at turn wheel travel.

LOW PUMP PRESSURE

Defective flow control valve. Defective pressure plate. Worn cam ring. Scored pressure plate, thrust plate or rotor. Defective or mis-assembled vanes (vane type pump).

TESTING

PRESSURE TEST

All Except Ford Motor Co. – 1) With belt tension correct, disconnect power steering pump pressure hose, keeping hose end raised to prevent excess fluid loss. Connect pressure hose of power steering pressure gauge to power steering pump fitting. Connect a second pressure hose from valve side of tester to steering gear inlet. Open valve fully and run engine until fluid obtains normal operating temperature. Check fluid level and add fluid if necessary.

2) On all models except Chrysler Corp., note pressure reading with valve open and engine idling. This pressure should be 80-125 psi. If pressure is in excess of 200 psi, check hoses for restrictions and poppet valve (in gear) for proper assembly. On all models, close tester valve fully and re-open three times. Record highest pressure noted each time. If pressures are within specifications and range of readings is within 50 psi, pump is operating satisfactory.

CAUTION – *DO NOT hold valve closed for more than 5 seconds as pump damage may result.*

3) If pressures recorded are high but do not repeat within 50 psi, flow control valve is sticking. If pump performance is to specifications, turn steering wheel to both stops with valve open and note highest pressures. If pump output cannot be met in either side of gear, gear is leaking internally. Shut off engine and remove tester. Reconnect all hoses and recheck fluid level.

CAUTION – *DO NOT hold wheel against stops for more than 5 seconds as pump may be damaged.*

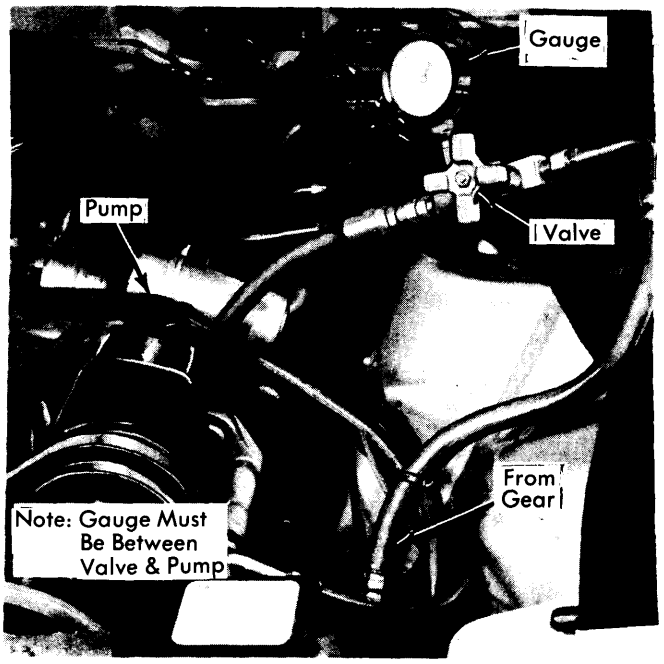

Fig. 2 Power Steering Pressure Test (All Exc. Ford Motor Co.)

Ford Motor Co. – Pump flow and pressure tests are completed using a suitable flow/pressure analyzer (14-0207) to determine system back pressure, pump flow and internal leakage in the steering gear, control valve and cylinder. Prior to making these tests, assure that tire pressure, belt tension and fluid levels are proper. Check entire system for damage and note pulley size and pump model for proper vehicle application. Reservoir must be kept full and at normal operating temperature (165-175°F) during testing. Attach tester and proceed as follows:

ALL MODELS (Cont.)

1) With engine idling, note flow (A) at approximately 1.6 gallons per minute and pressure (B) not above 150 psi.

2) Partially close tester valve to build pressure to 740 psi and note flow (C) at least equal to or above minimum shown in flow chart. If not, servicing is required.

Minimum Flow Chart (Ford Motor Co. Only)

Pump Model	Engine	Minimum Flow (GPM)
HBC-BR	All	1.45
HBC-BS	All	1.35
HBC-BT	All	1.25
HBC-BF, HBC-BG	All	1.60
HBC-BJ	2.3L (140")	1.40
HBC-BJ	3.3L (200")	1.20

NOTE – *Flow depends on pump model, engine RPM and pulley ratio. Engine idle RPM must be set to specification when checking minimum flow.*

3) Completely close and partially open valve three times noting pressure (D). (Do not allow valve to be closed for more than five seconds). Pressure readings 100 psi lower or 50 psi higher than specified indicate control valve cleaning or replacement is required.

4) Increase engine speed to approximately 1500 RPM and note flow (E) within one gallon/minute of idle flow (A). Control valve servicing will be required if flow varies beyond this amount.

5) Return engine to idle and turn steering wheel to left and right stops. Record pressure and flow (F) at stops to be nearly the same as maximum output pressure, while flow should drop below ½ gallon/minute. If pressure does not rise or flow does not drop as indicated, internal leakage is occuring. Steering gear or control valve and cylinder must be removed and serviced.

6) Turn steering wheel slightly in both directions and release quickly while watching pressure gauge. Needle should move from normal reading and snap back as wheel is released. A sticky or slow moving needle indicates that a rotary valve is sticking and requires further service.

TURNING EFFORT TEST (FORD MOTOR CO. ONLY)

With front wheels properly aligned and tire pressures correct, park vehicle on dry concrete and set parking brake. Idle engine for 2-3 minutes and turn steering wheel side to side several times to warm fluid. With engine running, attach a pull scale to rim of steering wheel. Measure pull required to turn wheel one complete revolution in each direction. Pull should be 5 lbs. during turning.

Pressure Test Specifications

Application	Pump Output Pressure (psi) Idle Pressure	Relief Pressure
American Motors (All)	80-125	1000-1100
Chrysler Corp.		
Front Wheel Drive		900-1000
Rear Wheel Drive		1200-1300
Ford Motor Co.		
HBC-BF, HBC-BG	150	1100-1350
HBC-BJ, HBC-BT	150	950-1200
HBC-BR	150	750-950
HBC-BS	150	1100-1350
General Motors		
Cadillac		
V6 Models	80-125	1250-1350
V8 Models	80-125	1365-1465
Corvette	80-125	900-1100
All Others	80-125	1250-1350

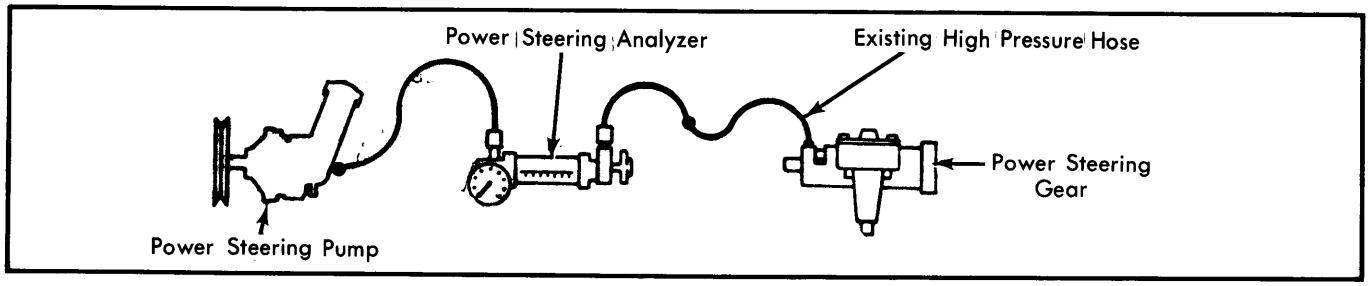

Fig. 3 Typical Power Steering Analyzer Installation