COOLING SYSTEM

GROUP 11

PART 11-1 GENERAL COOLING SYSTEM SERVICE

This part covers general cooling system service. For cooling system component removal, disassembly, assembly, installation, major repair procedures and specifications, refer to the pertinent part of this group.

Radiator identification on the downflow units can be found on the left hand side bracket, as viewed from the drivers seat. On the crossflow type the identification is marked on the top bracket. The radiator chart can be found in the specification section (Part 11-5). Note that the identification number found on the radiator bracket should be cross referenced to the service part number. Use the service part number to order a new part. As a double check, the number of fins per inch should be checked. However, for accuracy the total fins over at least four inches should be counted; then divided by the number of inches.

1 DIAGNOSIS AND TESTING

DIAGNOSIS

Engine overheating and slow engine warm-up are the two engine troubles most commonly attributed to the cooling system.

Loss of coolant, thermostat stuck in the closed position, restricted air flow through the radiator, or accumulation of rust and scale in the system are the main causes of overheating. Coolant loss may be due to external leakage at the radiator, radiator pressure cap, water pump, hose connections, heater, or core plugs. Coolant loss may also be caused by internal leakage due to a defective cylinder head gasket, improper tightening of the cylinder head bolts, or warped cylinder head or block gasket surfaces.

Internal leakage can be detected by operating the engine at fast idle and looking for the formation of bubbles in the radiator. Oil in the radiator may indicate leakage in the engine block or a leak in the automatic transmission oil cooler. Water formation on the oil level dipstick could also be an indication of internal leakage.

Rust and scale that form in the engine water passages are carried into the radiator passages by the circulation of the coolant. This clogs the radiator passages and causes overheating. Rust can be detected by the appearance of the coolant. If the coolant has a rusty or muddy appearance, rust is present.

A defective thermostat that remains open will cause slow engine warm-up.

DIAGNOSIS GUIDE

ENGINE OVERHEATS	Exhaust control valve sticking (except 170 and 200 engine). Belt tension incorrect. Radiator fins obstructed. Thermostat stuck closed, or otherwise defective. Cooling system passages blocked by rust, scale or other foreign matter. Water pump inoperative. Faulty fan drive clutch. Ignition initial timing incorrect. Distributor advance incorrect.
ENGINE FAILS TO REACH NORMAL OPERATING TEMPERATURE OR HAS WRONG INDICATED TEMPERATURE	Thermostat stuck open or of incorrect heat range. Temperature sending unit defective (causing gauge to indicate low engine temperature). Temperature gauge defective (not indicating true engine temperature) or incorrectly installed. Incorrect temperature gauge indication.
LOSS OF COOLANT	Leaking radiator, radiator supply tank, or transmission oil cooler. Loose or damaged hose connections. Water pump leaking. Cylinder head gasket defective. Improper tightening of cylinder head bolts. Cylinder block core plugs leaking. Cracked cylinder head or block, or warped cylinder head or block gasket surface. Radiator pressure cap defective or wrong type.

TESTING

COOLING SYSTEM PRESSURE TEST

It is recommended that a cooling system pressure test gauge be used to properly test the system for:

1. Blown or leaking cooling system sealing gaskets.

2. Internal or external coolant leakage.

3. Pressure cap malfunction.

Many types of pressure gauges are available for use. Therefore, it is recommended that the gauge manufacturer's instructions be followed when performing the test. **Never exceed the rated pressure indicated on the pressure cap when performing the pressure test.**

THERMOSTAT TEST— THERMOSTAT INSTALLED

The thermostat can be tested without removing it from the engine, by using the Rotunda Thermostat Tester. The engine should be cool (below 115°F.) when starting to perform this test.

1. Loosen the radiator cap to release any pressure; then re-tighten it.

2. Remove the temperature sending unit from the engine. A small amount of coolant may run out of the threaded opening but it should stop almost immediately. **If it does not stop running out, the pressure cap may be defective and should be tested. Replace it if defective.**

3. Calibrate the Rotunda Thermostat Tester by pressing the control button to the ADJUST position. While holding the control button in the ADJUST position, turn the adjusting knob until the indicator on the upper meter points to the SET position. Push the control switch to the ON position.

4. Screw the engine test probe into the threaded opening from which the temperature sending unit was removed (the dual fitting arrangement provides for use on any engine).

5. Attach the single connector from the Rotunda Thermostat Tester to the engine test probe and ground the tester by attaching the ground wire clip to any convenient place on the engine which will provide a good ground.

6. Remove the radiator cap, attach the double connector, and place the radiator test probe in the filler opening making certain that the probe is well immersed in the coolant.

7. Turn the heater temperature control to the OFF position, start the engine, and allow it to idle.

8. Watch the **lower meter** to read the warmup rate. The needle should move through the RED area into the GREEN (normal) area. This indicates that the thermostat is remaining closed allowing proper warmup. **If the needle remains in the RED area it means that the thermostat is stuck in the open position, is defective, and should be replaced.**

9. When the lower meter needle reaches the GREEN area, the upper meter needle will move toward the opening temperature of the thermostat. When this (upper metering) needle reaches the approximate opening temperature of the thermostat, the lower meter needle should move back through the RED area. When this happens, you can, by observing the upper meter needle, know that the thermostat is functioning and know at what temperature it is opening.

On six cylinder engines, the upper meter will momentarily drop somewhat below the thermostat opening temperature. This is normal and is due to the sending unit being located at the rear of the cylinder head.

THERMOSTAT TEST— THERMOSTAT REMOVED

It is good practice to test new thermostats before installing them in the engine.

Remove the thermostat and immerse it in boiling water. Replace the thermostat if it does not open more than ¼ inch.

If the problem being investigated is insufficient heat, the thermostat should be checked for leakage. This may be done by holding the thermostat up to a lighted background. Light leakage around the thermostat valve (thermostat at room temperature) is unacceptable and the thermostat should be replaced. It is possible, on some thermostats, that a slight leakage of light at one or two locations on the perimeter of the

valve may be detected. This should be considered normal.

FAN DRIVE CLUTCH TEST

1. Run the engine at approximately 1000 rpm until normal operating temperature is reached. This process can be speeded up by blocking off the front of the radiator with cardboard. Regardless of temperatures, the unit must be operated for at least five minutes immediately before being tested.

2. Stop the engine and, using a cloth to protect the hand, immediately check the effort required to turn the fan. If considerable effort is required, it can be assumed that the coupling is operating satisfactorily. If very little effort is required to turn the fan, it is an indication that the coupling is not operating properly, and it should be replaced.

2 MAINTENANCE

COOLANT

Correct coolant level is essential for maximum circulation and adequate cooling. In addition, for the cooling system to perform its function, it must receive proper care. This includes keeping the radiator fins clean and a periodic inspection of the cooling system for leakage.

Use care when removing the radiator cap to avoid injury from escaping steam or hot water.

In production, the cooling system is filled with a long-life coolant mixture which prevents corrosion, keeps the cooling system clean, provides anti-freeze protection to −35°F in winter and provides for summer operation at system temperatures up to 250°F without boiling.

For the most effective cooling system operation, this mixture strength should be maintained all year round and in all climates.

All coolant added should be a 50-50 mixture of Rotunda permanent anti-freeze and water.

To avoid possible overheating in very hot weather, do not use mixtures with more than 50% anti-freeze except in areas where anti-freeze protection below −35° is required. In this case, refer to the coolant mixture chart on the Rotunda permanent anti-freeze container.

Whenever the system is completely refilled, add a can of Rotunda Radiator Rust Inhibitor.

A standard ethylene glycol hydrometer can be used to check the protection level of the long-life coolant.

Refer to Group 19 for the recommended cooling system drain interval.

DRAINING AND FILLING THE COOLING SYSTEM

To prevent loss of anti-freeze when draining the radiator, attach a hose on the radiator drain cock and drain the anti-freeze from the radiator into a clean container.

To drain the radiator, open the drain cock located at the bottom of the radiator. The 6-cylinder engine block has one drain plug located at the right rear of the cylinder block, ahead of the starter (Fig. 1). The V-8 engines have a drain plug on each side of the cylinder block.

To fill the cooling system, close the drain cock. Install the block drain plug(s). Disconnect the heater outlet hose at the water pump to bleed or release trapped air in the system. When the coolant begins to escape, connect the heater outlet hose.

Operate the engine until normal operating temperature is reached, and add more coolant, if necessary, to fill the radiator to the proper level, one inch below bottom of filler neck.

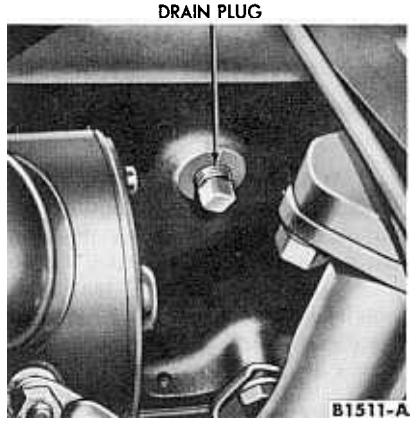

FIG. 1—Typical Cylinder Block Drain Plug

After the initial fill the coolant level may drop approximately one quart after the engine has been operated about 20 minutes at 2000 rpm. This is due to the displacement of entrapped air. Refill to the proper level.

FAN DRIVE BELTS

If the fan drive belt(s) are noisy, check the tension of the belts to make certain they are within specifications. Also, check for misaligned pulleys. If the drive belts are worn or frayed, replace them following the procedures in Part 11-1, Section 3.

3 COMMON ADJUSTMENTS AND REPAIRS

ADJUSTMENTS

DRIVE BELTS

The fan drive belt(s) should be properly adjusted at all times. A loose drive belt(s) causes improper alternator, fan and water pump operation. A belt(s) that is too tight places a severe strain on the water pump and the alternator bearings.

Properly tensioned drive belts minimize noise and also prolong service life of the belt. Therefore, it is recommended that a belt tension gauge be used to check and adjust the belt tension. **Any belt that has operated for a minimum of 10 minutes is considered a used belt, and when adjusted, it must be adjusted to the reset tension shown in the specications.**

Belt Tension

1. Install the belt tension tool on the drive belt (Fig. 2) and check the tension following the instructions of the tool manufacturer.

Tool—T63L-8620-A

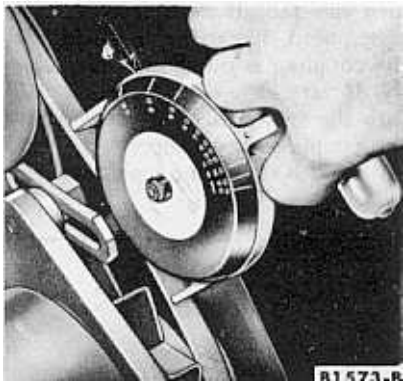

FIG. 2—Checking Drive Belt Tension

2. If adjustment is necessary, loosen the alternator mounting and adjusting arm bolts. Move the alternator toward or away from the engine until the correct tension is obtained. Tighten the alternator adjusting arm and the mounting bolts. Check the belt tension.

REPAIRS

FAN REPLACEMENT

6-Cylinder Engines

1. Loosen the fan belt. Remove the capscrews and lock washers retaining the fan to the water pump hub. Remove the fan.

2. Position the fan on the water pump hub. Install the lock washers and capscrews and torque the capscrews to specifications. Adjust the fan belt.

V-8 Engines

On a car with an air conditioner or extra-cooling radiator, a fan drive clutch may be used. Cars without air conditioning utilize a pulley-to-fan spacer.

1. Remove the radiator upper support and fan guard. Loosen the fan belt. Remove the capscrews and lock washers retaining the fan and spacer (or fan drive clutch) to the water pump hub. Remove the fan and spacer (or fan drive clutch).

2. If equipped with a fan drive clutch, remove the retaining capscrews and lock washers and separate the fan from the drive coupling. Position the replacement fan on the drive clutch and install the lock washers and capscrews.

3. Position the fan and spacer (or drive clutch) on the water pump hub and install the lock washers and capscrews. Torque the capscrews evenly and alternately to specifications. Adjust the fan belt tension to specifications. Install the radiator upper support and fan guard.

FAN DRIVE BELT REPLACEMENT

1. On a car with power steering, loosen the power steering pump bracket at the water pump and remove the drive belt.

On a car with an air conditioner, remove the compressor drive belt.

2. Loosen the alternator mounting and adjusting arm bolts. Move the alternator toward the engine. Remove the belt(s) from the alternator and crankcase pulleys, and lift them over the fan.

3. Place the belt(s) over the fan. Insert the belt(s) in the water pump pulley, crankshaft pulley and alternator pulley grooves. Adjust the belt tension to specifications.

4. On a car with an air conditioner, install and adjust the compressor drive belt to specifications.

5. On a car with power steering, install the power steering pump drive belt and tighten the pump bracket to the water pump. Adjust the drive belt tension to specifications.

RADIATOR HOSE REPLACEMENT

Radiator hoses should be replaced whenever they become cracked, rotted or have a tendency to collapse.

1. Drain the radiator; then loosen the clamps at each end of the hose to be removed. Slide the hose off the radiator connection and the radiator supply tank connection (upper hose) or the water pump connection (lower hose).

2. Position the clamps at least ⅛" from each end of the hose. Slide the hose on the connections. **Make sure the clamps are beyond the bead and placed in the center of the clamping surface of the connections.** Tighten the clamps. Fill the radiator with coolant. Operate the engine for several minutes; then check the hoses and connections for leaks. Check for proper coolant level after the engine has reached normal operating temperature.

THERMOSTAT REPLACEMENT

A poppet-type thermostat is mounted in a recess in the coolant outlet passage at the front of the intake manifold on the V-8 engines. On 6-cylinder engines, the thermostat is located in the coolant outlet passage at the front of the cylinder head. When the thermostat is closed, coolant flows to the water pump through a bypass passage at the front of the engine. When the thermostat is open, coolant flows through the coolant outlet elbow (thermostat housing) to the radiator.

The thermostat used in production is for use with water or permanent-type anti-freeze. A thermostat is also available for use with non-permanent-type anti-freeze or water. For operating temperatures, refer to specifications.

Check the thermostat before installing it following the procedure under "Thermostat Test", Part 11-1.

Do not attempt to repair the thermostat. It should be replaced if it is not operating properly.

Removal

1. Drain the cooling system below the level of the coolant outlet housing.

2. Remove the coolant outlet housing retaining bolts and slide the housing (with the hose attached) to one side.

3. Remove the thermostat and gasket.

Installation

1. Clean the coolant outlet housing and cylinder head surface. Coat a new coolant outlet housing gasket with sealer. Position the gasket on the cylinder head or intake manifold (289 V-8). **The gasket must be positioned on the cylinder head or intake manifold before the thermostat is installed.**

2. Coat the edge of the thermostat with grease for thermostat adhesion. Position the thermostat in the recess of the coolant outlet housing so that the copper pellet or heat element will be in the cylinder head or intake manifold (289 V-8). Install the thermostat with the word TOP toward the top of the engine and the valve end of the thermostat facing outward. **If the thermostat is improperly positioned, it will cause the engine to overheat.**

3. Position the coolant outlet housing and install the retaining screws. Torque the screws to specifications.

4. Fill the radiator. Operate the engine and check for coolant leaks and proper coolant level after the engine reaches normal operating temperature.

4 CLEANING AND INSPECTION

CLEANING COOLING SYSTEM

To remove rust, sludge and other foreign material from the cooling system, use Rotunda Cooling System Cleanser. Removal of such material restores cooling efficiency and avoids over-heating.

In severe cases where cleaning solvents will not properly clean the cooling system for efficient operation, it will be necessary to use the pressure flushing method.

Various types of flushing equipment are available. If pressure flushing is used, make sure the cylinder head bolts are properly tightened to prevent possible water leakage into the cylinders.

Always remove the thermostat prior to pressure flushing.

A pulsating or reversed direction of flushing water flow will loosen sediment more quickly than a steady flow in the normal direction of coolant flow.

WATER PUMP

1. Clean the gasket mounting surfaces of the water pump and cylinder block.

2. Clean and inspect the seal seating surface of the water pump.

3. Clean the pump housing and inspect it for cracks, sand holes, improper machining, and damaged surfaces. If the water pump housing is damaged beyond repair, replace the complete water pump.

PART 11-2 WATER PUMP

1 DESCRIPTION AND OPERATION

On 6-cylinder engines, a centrifugal-type water pump is mounted on the front of the cylinder block. On the 289 V-8, the centrifugal-type water pump is mounted on the cylinder front cover. On the 390 V-8 the centrifugal-type water pump is mounted at two points on the cylinder block. The water pump inlet port is connected to the radiator bottom tank to draw coolant from the radiator when the thermostat is open. On the V-8 engines, a bypass port on the water pump is connected to the coolant outlet housing to permit coolant circulation within the engine when the thermostat is closed, bypassing the radiator. On the 6-cylinder engines, the water pump bypass passage is aligned with a bypass passage in the cylinder block for coolant circulation in the engine when the thermostat is closed.

A vane-type, impeller supplies coolant through centrifugal action to the water pump outlet port on 6-cylinder engines. On the V-8 engines, the water pump has two outlet ports, one for each cylinder bank, to provide uniform coolant circulation in both banks of the engine.

The water pumps have a sealed bearing integral with the water pump shaft. The bearing requires no lubrication. A bleed hole in the water pump housing allows water that may leak past the seal to be thrown out by the slinger. **This is not a lubrication hole.**

The cooling fan hub is pressed a specified distance onto the water pump shaft.

2 REMOVAL AND INSTALLATION

170 SIX AND 200 SIX

REMOVAL

1. Drain the cooling system.

On a car with power steering, remove the power steering drive belt.

On a car with air conditioning, remove the compressor drive belt.

2. Disconnect the radiator lower hose at the water pump. Remove the drive belt, fan, or fan and drive clutch, and water pump pulley.
3. Disconnect the heater hose at the water pump.
4. Remove the water pump.

INSTALLATION

Before a water pump is reinstalled, check it for damage. If it is damaged and requires repair, replace it with a new pump or install a rebuilt pump obtained from a Ford-Authorized Reconditioner.

1. If a new water pump is to be installed, remove the heater hose fitting from the old pump and install it on the new pump. Clean the gasket surfaces on the water pump and cylinder block.
2. Coat a new gasket on both sides with water-resistant sealer and position it on the cylinder block.
3. Position the water pump in place and install the lock washers and retaining bolts (the alternator adjusting arm is retained by one water pump bolt). Torque the bolts to specifications.
4. Connect the radiator lower hose and the heater hose to the water pump.
5. Install the water pump pulley and fan or fan and drive clutch. Torque the bolts evenly and alternately to specifications.
6. Install the drive belt and adjust the tension to specifications.

On a car with power steering, install the drive belt and adjust the tension to specifications.

On a car with air conditioner, install the compressor drive belt and adjust the tension to specifications.

7. Fill and bleed the cooling system. Operate the engine until normal operating temperature is reached. Check for leaks and check the coolant level.

289 V-8

REMOVAL

1. Drain the cooling system.

On a car with power steering, remove the power steering drive belt. Remove the power steering pump and bracket, as an assembly, and position to one side.

On a car with an air conditioner, remove the compressor drive belt.

2. Disconnect the radiator lower hose and heater hose at the water pump. Loosen and remove the drive belt. Remove the fan, fan spacer or fan drive clutch and pulley.
3. Loosen the bypass hose clamp at the water pump.
4. Remove the bolts retaining the pump to the cylinder front cover. Remove the pump and gasket. Discard the gasket.

INSTALLATION

Before a water pump is re-installed, check it for damage. If it is damaged and requires repair, replace it with a new pump or install a rebuilt pump obtained from a Ford-Authorized Reconditioner.

1. Remove all gasket material from the mounting surfaces of the cylinder front cover and water pump.
2. Position a new gasket, coated on both sides with water-resistant sealer, on the cylinder front cover then install the pump.

3. Install the retaining bolts and torque them to specifications.

On a car with power steering, install the power steering pump and the drive belt and adjust the tension to specifications.

On a car with an air conditioner, install the compressor drive belt and adjust the tension to specifications.

4. Install the pulley, spacer or fan drive clutch and fan. Install and adjust the drive belt to the specified belt tension. Connect the radiator hose and heater hose.

5. Fill and bleed the cooling system. Operate the engine until normal operating temperatures have been reached and check for leaks.

390 V-8

REMOVAL

1. Drain the cooling system.

On a car with power steering remove the power steering drive belt; then remove the power steering pump and bracket as an assembly, and position to one side. If so equipped, remove the air conditioner drive belt.

2. Disconnect the lower radiator hose, and the heater hose at the water pump.

3. Loosen and remove the fan belt. Remove the fan, the spacer, and the water pump pulley.

4. Loosen the bypass hose clamp at the water pump.

5. Remove the alternator and position it to one side.

6. Remove the retaining bolts, and remove the water pump.

INSTALLATION

Before a water pump is re-installed, check it for damage. If it is damaged and requires repair, replace it with a new pump or install a rebuilt pump obtained from a Ford-Authorized Reconditioner.

1. Remove all gasket material from the mounting surfaces of the block and the water pump.

2. Coat new gaskets on both sides with water resistant sealer. Position them on the block.

3. Apply water resistant sealer to the bypass fitting and, sliding the bypass hose into position, install the pump and the retaining bolts, and torque them to specifications.

4. Install the alternator.

5. Tighten the bypass hose clamp at the water pump.

6. Install the water pump pulley, the spacer, and the fan. Install the retaining screws, and torque them to specifications. Install and adjust the fan belt.

7. Connect the lower radiator hose and the heater hose at the water pump.

On a car with power steering install the power steering pump and bracket assembly, and install and adjust the drive belt. If so equipped, install and adjust the air conditioner drive belt.

8. Fill and bleed the cooling system. Operate the engine until normal operating temperatures have been reached, and check for leaks.

PART 11-3 RADIATOR

1 DESCRIPTION AND OPERATION

The radiators are of the tube and corrugated-fin-core type with the tubes arranged for vertical flow of the coolant. Two header tanks, one on the top and one on the bottom of the radiator provide uniform distribution of the coolant to the tubes. The radiator outlet port (lower header tank) is connected to the water pump inlet port. The radiator inlet port (upper header tank) is connected to the coolant outlet housing of the engine, thereby permitting coolant circulation through the radiator when the thermostat is open.

2 REMOVAL AND INSTALLATION

REMOVAL

1. Drain the cooling system. Disconnect the radiator upper and lower hoses at the radiator.

2. On a car with automatic transmission, disconnect the oil cooler lines at the radiator.

3. Remove the radiator support bolts and remove the radiator.

INSTALLATION

1. If a new radiator is to be installed, remove the drain cock from the old radiator and install it in the new radiator. On a car with automatic transmission, remove the oil cooler line fittings from the old radiator, and install them in the new radiator, using oil-resistant sealer.

2. Position the radiator assembly and install the support bolts.

3. Connect the radiator upper and lower hoses.

On a car with automatic transmission, connect the oil cooler lines.

4. Close the drain cock. Fill and bleed the cooling system.

5. Operate the engine and check for leaks at the hose connections and the automatic transmission oil cooler lines. Check the automatic transmission fluid level.

PART 11-4 FAN DRIVE CLUTCH

1 DESCRIPTION AND OPERATION

The fan drive clutch (Fig. 3) is a fluid coupling containing silicone oil. Fan speed is regulated by the torque-carrying capacity of the silicone oil. The more silicone oil in the coupling the greater the fan speed, and the less silicone oil the slower the fan speed.

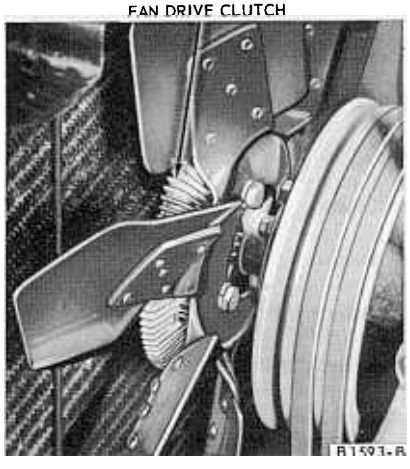

FIG. 3—Typical Fan Drive Clutch Installation

Two types of fan drive clutches are available. On one (Fig. 4) a bi-metallic strip and control piston on the front of the fluid coupling regulates the amount of silicone oil entering the coupling. The bi-metallic strip bows outward with a decrease in surrounding temperature and allows a piston to move outward. The piston opens a valve regulating the flow of silicone oil into the coupling from a reserve chamber. The silicone oil is returned to the reserve chamber through a bleed hole when the valve is closed.

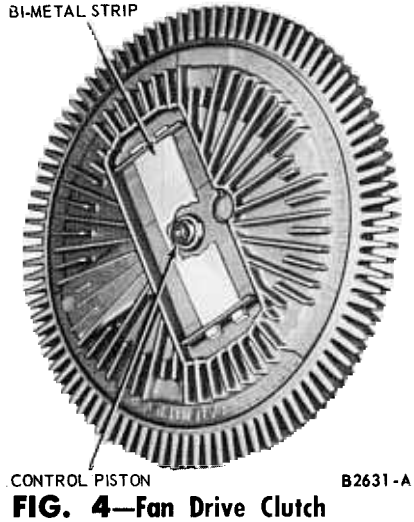

FIG. 4—Fan Drive Clutch With Flat Bi-Metal Spring

On the other type of fan drive clutch (Fig. 5) a heat-sensitive, bi-metal spring connected to an opening plate brings about a similar result. Both units cause the fan speed to increase with a rise in temperature and to decrease as the temperature goes down.

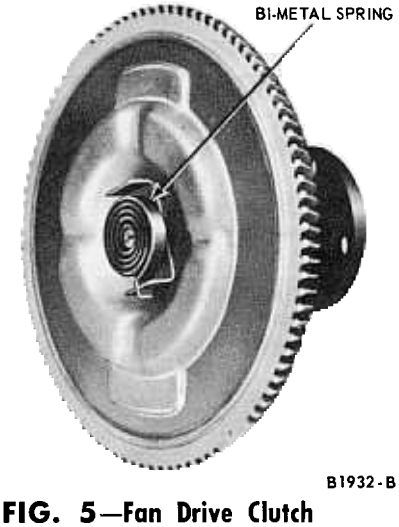

FIG. 5—Fan Drive Clutch With Flat Coil Bi-Metal Spring

In some cases a Flex-Fan is used instead of a Fan Drive Clutch. Flexible blades vary the volume of air being drawn through the radiator, automatically increasing the pitch at low engine speeds.

2 REMOVAL AND INSTALLATION

REMOVAL

1. Loosen the fan belt. Remove the capscrews retaining the fan drive clutch to water pump hub (Fig. 4). Remove the fan drive clutch and fan as an assembly.
2. Remove the retaining capscrews and separate the fan from the drive clutch.

INSTALLATION

1. Position the fan on the drive clutch and install and tighten the retaining capscrews evenly and alternately to specifications.
2. Position the fan drive clutch and fan assembly to the water pump hub (Fig. 4). Install and tighten the retaining capscrews evenly and alternately to specifications. Check the fan clutch mounting face for proper alignment.
3. Adjust the fan belt.

PART 11-5 SPECIFICATIONS

COOLING SYSTEM CAPACITY

	Approximate Capacity① (Quarts)	
	U.S. Measure	Imperial Measure
STANDARD COOLING SYSTEM		
170 and 200	9½	8
289	15	12½

① Includes heater. If deleted, subtract one quart.

THERMOSTATS

LOW TEMPERATURE	
OPENS °F	
170 and 200	157°-164°
289	155°-162°
FULLY OPEN	
170 and 200	184°-186°
289	182°
HIGH TEMPERATURE	
OPENS °F	
170 and 200	185°-192°
289	188°-195°
FULLY OPEN	
170 and 200	211°-214°
289	210°-212°

WATER PUMP

WATER PUMP DRIVE ARRANGEMENT	
Water pump, fan and alternator drive belt from crankshaft damper.	
WATER PUMP PULLEY TO ENGINE RATIO	
Standard Cooling and Air Conditioner—Equipped	
170	1.04:1
200	1.18:1
289	1.04:1
289 (With Thermactor)	1.13:1
WATER PUMP ASSEMBLY DIMENSIONS	
Front Face of Pulley Hub to Pump Housing Face	
170 and 200	3.94
289	5.426
Impeller to Housing Cover Mounting Surface Clearance	
170 and 200	0.011-0.045
289	0.030-0.050

DRIVE BELT TENSION

ALL BELTS	LBS.
New	110-140
Used (any belt operated over 10 minutes)	80-110

TORQUE VALUES

NOTE: All specifications are given in Ft-Lbs. unless otherwise noted.

Water Pump to Cylinder Block (or Cylinder Front Cover)	
All Engines	12-15
Water Outlet Housing	
All Engines	12-15
Fan and Spacer to Pulley Hub	
All Engines	10-15
Fan to Fan Clutch (with a/c)	
All Engines	10-15
Radiator to Front End Sheet Metal	
All Engines	8-13
Radiator to Engine Hose Clamps	
All Engines	1.0-2.5
Transmission Oil Cooler Tube Hose to Radiator	
Fairlane	8-12
Transmission Oil Cooler Tube Nut to Bottom of Radiator	
All Except Fairlane	10-15
Radiator Inlet and Outlet Hose Clamps	
All Engines	1.0-2.5

SPECIAL SERVICE TOOLS

FORD TOOL NO.	FORMER TOOL NO.	DESCRIPTION
T63-8620-A	8620-A	Belt Tension Gauge

RADIATOR AND COOLING FAN IDENTIFICATION

Radiator dimensions are given for the core only; do not measure the mounting flanges or header tanks.

CAR, ENGINE AND COOLING	RADIATOR IDENTIFICATION Dimensions—Inches				TRANSMISSION		THERMACTOR EQUIPPED		RADIATOR SERVICE PART NUMBER	FANS—DIAMETER X BLADE WIDTH AND NO. BLADES (4)	
	Depth	Height	Width	Fins/Inch	Std.	Auto.	No	Yes		W/O Thermactor	W/Thermactor
COMET											
200 Six											
Std. Cool.	1.27	17.38	17.24	8	X		X	X	C6OZ-E	15.50 x 1.40(4)	15.50 x 1.40(4)
Std. Cool.	1.27	17.38	17.24	10		X	X	X	C6OZ-E	15.50 x 1.40(4)	15.50 x 1.40(4)
Ext. Cool.	1.27	17.38	20.24	11	X	X	X	X	C3OZ-F	17.00 x 2.00(5)	17.00 x 2.00(5)
Air. Cond.	1.27	17.38	20.24	11	X	X	X	X	C3OZ-F	①17.00 x 1.75(6)	17.00 x 1.75(6)
298 V-8											
Std. Cool.	1.27	17.38	17.24	11	X	X	X	X	C5OZ-D	17.50 x 2.00(4)	17.00 x 1.75(4)
Ext. Cool.	1.27	17.38	20.24	15	X	X	X	X	C5OZ-C	17.00 x 2.00(5)	17.00 x 2.00(5)
Air. Cond.	1.27	17.38	20.24	15	X	X	X	X	C5OZ-C	①17.50 x 2.00(7)	17.50 x 2.00(7)
390 V-8											
Std. Cool.	1.27	17.38	23.24	10	X		X	X	C6OZ-B	18.50 x 2.00(4)	18.50 x 2.00(4)
Std. Cool.	1.95	17.38	23.24	9		X	X	X	C6OZ-D	18.50 x 2.00(4)	18.50 x 2.00(4)
Ext. Cool.	1.95	17.38	23.24	14	X	X	X	X	C6OZ-A	18.00 x 2.00(7)	18.00 x 2.00(7)
Air. Cond.	1.95	17.38	23.24	14	X	X	X	X	C6OZ-A	①18.00 x 2.00(7)	18.00 x 2.00(7)
FALCON											
170 Six											
Std. Cool.	1.27	16.44	17.24	8	X		X	X	C6DZ-A	15.50 x 1.40(4)	16.00 x 1.40(4)
Std. Cool.	1.27	16.44	17.24	10		X	X	X	C6DZ-A	15.50 x 1.40(4)	16.00 x 1.40(4)
Std. Cool.	1.27	17.38	17.24	8	X		X	X	C6OZ-E	15.50 x 1.40(4)	16.00 x 1.40(4)
Std. Cool.	1.27	17.38	17.24	10		X	X	X	C6OZ-E	15.50 x 1.40(4)	16.00 x 1.40(4)
Ext. Cool.	1.27	17.38	20.24	11	X	X	X	X	C3OZ-F	15.50 x 1.40(4)	16.00 x 1.40(4)
Air Cond.	1.27	17.38	20.24	11	X	X	X	X	C3OZ-F	①17.00 x 1.75(6)	17.00 x 1.75(6)
200 Six											
Std. Cool.	1.27	16.44	17.24	10	X		X	X	C6DZ-C	15.50 x 1.40(4)	16.00 x 1.40(4)
Std. Cool.	1.27	16.44	17.24	12		X	X	X	C6DZ-C	15.50 x 1.40(4)	16.00 x 1.40(4)
Std. Cool.	1.27	17.38	17.24	8	X		X	X	C6OZ-E	15.50 x 1.40(4)	16.00 x 1.40(4)
Std. Cool.	1.27	17.38	17.24	10		X	X	X	C6OZ-E	15.50 x 1.40(4)	16.00 x 1.40(4)
Ext. Cool.	1.27	17.38	20.24	11	X	X	X	X	C3OZ-F	15.50 x 1.40(4)	16.00 x 1.40(4)
Air. Cond.	1.27	17.38	20.24	11	X	X	X	X	C3OZ-F	①17.00 x 1.75(6)	17.00 x 1.75(6)
289 V-8											
Std. Cool.	1.27	16.44	17.24	10	X		X	X	C6DZ-B	17.50 x 2.00(4)	17.50 x 2.00(4)
Std. Cool.	1.27	16.44	17.24	12		X	X	X	C6DZ-B	17.50 x 2.00(4)	17.50 x 2.00(4)
Std. Cool.	1.27	17.38	17.24	11	X	X	X	X	C5OZ-D	17.50 x 2.00(4)	17.50 x 2.00(4)
Ext. Cool.	1.27	17.38	20.24	15	X	X	X	X	C5OZ-C	17.00 x 2.00(5)	17.00 x 2.00(5)
Air. Cond.	1.27	17.38	20.24	15	X	X	X	X	C5OZ-C	①17.50 x 2.00(7)	17.50 x 2.00(7)
FAIRLANE											
200 Six											
Std. Cool.	1.27	17.38	17.24	8	X		X	X	C6OZ-E	15.50 x 1.40(4)	15.50 x 1.40(4)
Std. Cool.	1.27	17.38	17.24	10		X	X	X	C6OZ-E	15.50 x 1.40(4)	15.50 x 1.40(4)
Ext. Cool.	1.27	17.38	20.24	11	X	X	X	X	C3OZ-F	17.00 x 2.00(5)	17.00 x 2.00(5)
Air Cond.	1.27	17.38	20.24	11	X	X	X	X	C3OZ-F	①17.00 x 1.75(6)	17.00 x 1.75(6)
289 V-8											
Std. Cool.	1.27	17.38	17.24	11	X	X	X	X	C5OZ-D	17.50 x 2.00(4)	17.00 x 1.75(4)
Ext. Cool.	1.27	17.38	20.24	15	X	X	X	X	C5OZ-C	17.00 x 2.00(5)	17.00 x 2.00(5)
Air Cond.	1.27	17.38	20.24	15	X	X	X	X	C5OZ-C	①17.50 x 2.00(7)	17.50 x 2.00(7)

RADIATOR AND COOLING FAN IDENTIFICATION (Continued)

CAR, ENGINE AND COOLING	RADIATOR IDENTIFICATION Dimensions—Inches				TRANSMISSION		THERMACTOR EQUIPPED		RADIATOR SERVICE PART NUMBER	FANS—DIAMETER X BLADE WIDTH AND NO. BLADES (4)	
	Depth	Height	Width	Fins/Inch	Std.	Auto.	No	Yes		W/O Thermactor	W/Thermactor
FAIRLANE (Cont'd)											
390 V-8											
Std. Cool.	1.27	17.38	23.24	10	X		X	X	C6OZ-B	18.50 x 2.00(4)	18.50 x 2.00(4)
Std. Cool.	1.95	17.38	23.24	9		X	X	X	C6OZ-D	18.50 x 2.00(4)	18.50 x 2.00(4)
Ext. Cool.	1.95	17.38	23.24	14	X	X	X	X	C6OZ-A	18.00 x 2.00(7)	18.00 x 2.00(7)
Air Cond.	1.95	17.38	23.24	14	X	X	X	X	C6OZ-A	①18.00 x 2.00(7)	18.00 x 2.00(7)
MUSTANG											
200 Six											
Std. Cool.	1.27	16.44	17.24	9	X		X		C5ZZ-C	15.50 x 1.40(4)	
Std. Cool.	1.27	16.44	17.24	10	X			X	C5ZZ-C		16.00 x 1.40(4)
Std. Cool.	1.27	16.44	17.24	11		X	X		C5ZZ-C	15.50 x 1.40(4)	
Std. Cool.	1.27	16.44	17.24	12		X		X	C5ZZ-C		16.00 x 1.40(4)
Ext. Cool.	1.27	16.44	17.24	13	X		X	X	C5ZZ-C	15.50 x 1.40(4)	16.00 x 1.40(4)
Ext. Cool.	1.27	16.44	17.24	15		X	X	X	C5ZZ-C	15.50 x 1.40(4)	16.00 x 1.40(4)
Air Cond.	1.27	16.44	17.24	13	X		X	X	C5ZZ-C	②15.00 x 2.00(6)	15.00 x 2.00(6)
Air Cond.	1.27	16.44	17.24	15		X	X	X	C5ZZ-C	15.00 x 2.00(6)	15.00 x 2.00(6)
289 V-8											
Std. Cool.	1.27	16.44	17.24	10	X		X	X	C3DZ-K	17.50 x 2.00(4)	17.00 x 2.00(5)
Std. Cool.	1.27	16.44	17.24	12		X	X	X	C3DZ-K	17.50 x 2.00(4)	17.00 x 2.00(5)
Ext. Cool.	1.27	16.44	17.24	12	X		X	X	C3DZ-K	17.50 x 2.00(4)	17.00 x 2.00(5)
Ext. Cool.	1.27	16.44	17.24	15		X	X	X	C3DZ-K	17.50 x 2.00(4)	17.00 x 2.00(5)
Air Cond.	2.20	16.00	17.24	11½	X	X	X	X	C6ZZ-A	③17.50 x 2.00(7)	17.50 x 2.25(7)

① Selectaire ② Economy