IMPORTANT

WHEN AN IMPROPER SPRAY PATTERN OR FUEL LEAKAGE IS NOTED WHILE TEST-ING AN INJECTOR ON WHICH YOU HAVE INSTALLED A NEW NOZZLE ASSEMBLY, CHECK YOUR REPAIR PROCEDURE AS FOLLOWS:

- 1. Did you disassemble the new nozzle and wash both the valve and body in clean diesel fuel to remove the protective coating before assembling it to the holder?
- 2. Is your injector repair room absolutely clean and free of dust?
- 3. Are you using lint free cloths? Remember -- Do not use laundered shop cloths. These cloths may contain metal particles that will ruin an injection nozzle.
- 4. Is the oil in your injector test stand absolutely clean? Is the test stand high pressure tubing connection for the injector absolutely clean? Is the test stand oil filter in place and in good condition? Carelessness in caring for the injector test stand will result in pump abrasives directly into the injector.



5. Did the new nozzle body and nozzle valve become mismated or damaged from dropping or careless handling before installation?

CASE POWRCEL General Description



Figure I-42. Cutaway View of Powrcel and Cylinder Head Assembly

A Case Powrcel is located in the cylinder head exactly opposite each of the fuel injectors, as shown in Figure I-42. It is the function of the Powrcel to uniformly control the combustion process in each cylinder so that every atom of fuel injected is used to the greatest advantage. The Powrcel and the fuel injector are a team. When one is checked or serviced, the other must also be checked and serviced.

Each Powrcel consists of three parts:

1. The Powrcel Clamp Screw

2. The Powrcel Cap

3. The Powrcel Body

The stepped surfaces of the Powrcel body and their contacting surfaces in the cylinder head recess are a lapped fit to form a seal.

A Powrcel Body Locating Pin holds the body in position in the cylinder head recess and prevents it from being installed incorrectly, Figure I-42. The pin is installed in the cylinder head and protrudes into the bottom of the Powrcel recess. A groove is provided in the Powrcel Body which must be aligned with the pin in order to install the body in the head.

Servicing the Case Powrcel

The Case Powrcel will seldom require servicing as the efficient design of the Powrcel, together with that of the combustion chamber, gives it a self-cleaning action.

In almost every instance, a carbon fouled or burned Powrcel can be traced to: an improperly functioning injector, using fuel that does not meet Case specifications, or as a result of repairing or replacing a Powrcel without using the proper tools and installation procedure.

NOTE A carbon fouled Powrcel, a burned or damaged Powrcel, or an improperly installed Powrcel will be evidenced by:

1. Engine vibration (misfiring).

2. Exhaust smoke, especially under load.

3. Loss of power.

4. Pronounced detonation (knock) at low engine speeds.

WHEN A POWRCEL IS REMOVED FOR CHECKING AND IS FOUND TO BE CARBON FOULED OR BURNED, CHECK THE FUEL IN-JECTOR OPPOSITE IT.

Tools Required

CD 500, 550 or CD 800 Tool Kit

CD 511 Powrcel Cap Puller

CD 512 Powrcel Body Puller

CD 516 Carbon Reamer for Powrcel Recess

Mutton Tallow for Use with Lapping

Brass Wire Brush

Lapping Plate

Torque Wrench with 1-3/8 Inch Socket

General Shop Service Tools

Removing Powrcel



Figure I-43. Powrcel Parts and Tools Required to Remove Them From Cylinder Head

- 1. Clean the left hand side of the engine thoroughly.
- 2. Using a 1-1/8 inch socket, remove the Powrcel Clamp Screw. It will be necessary to remove the intake manifold in order to remove all of the Powrcels. Refer to the section covering "Valve System and Cylinder Heads".
- 3. Pull the Powrcel Cap, Figures I-43 and I-44 using the CD 511 Puller from the



Figure I-44. Pulling Powrcel Cap

CD 500 or CD 800 Tool Kit.

4. Using the CD 512 Puller from the CD 500 or CD 800 Tool Kit, pull the Powrcel body. Refer to Figures I-43 and I-45.

NOTE Keep each Powrcel assembly together. The Powrcel Cap and Body are lapped to form a mated assembly. Make sure each assembly is identified after removal so it will be reinstalled in the same cylinder.



Figure I-45. Pulling Powrcel Body

Installing Powrcel

- 1. Before installing a Powrcel assembly that has been checked and cleaned thoroughly of carbon, or before installing a new Powrcel assembly, the recess in the cylinder head for the Powrcel must be cleaned of all carbon.
 - a. Use the CD 516 Carbon Reamer provided in the CD 550 or CD 800 Tool Kit to clean the contacting surfaces of the cylinder head so the Powrcel will seal with the head after installation, Figure I-46.
 - b. Decompress the engine and turn it over with the starting motor to blow any loose carbon out of the cylinder head recess.

IMPORTANT Failure to remove all carbon from the exterior of the Powrcel and from the cylinder head recess may prevent a seal from being formed and will not permit the Powrcel Body to be positioned correctly. Leakage between the Powrcel and the cylinder head will cause poor combustion in that cylinder and will result in irreparable damage to the Powrcel and possibly to the cylinder head.

2. Insert the Powrcel Body in the Cylinder Head recess.

CAUTION The groove in the Powrcel Body must be aligned with the Powrcel Body Locating Pin that protrudes into the cylinder head recess, as shown in Figure I-46. Use care not to damage or break off the locating pin when installing the body. Never attempt to force the body into the cylinder head recess. The body should slide into the recess easily if all carbon has been removed and if the groove in the body is aligned with the locating pin.

IF A POWRCEL BODY LOCATING PIN IS DAMAGED OR BROKEN OFF, THE CYL-INDER HEAD MUST BE REMOVED AND A NEW PIN INSTALLED. Refer to Page I-26.

The correct positioning of the Powrcel Body in the cylinder head by means of the locating pin is vital to engine performance. An incorrectly positioned body will seriousily affect the combustion process in that cylinder and will result in misfiring, exhaust smoke and power loss.

3. With the Powrcel Body correctly positioned in the cylinder head, install the Powrcel Cap and Clamp Screw, as shown in Figure I-47.



Figure I-46



Figure I-47

4. Using a torque wrench and 1-1/8 inch socket, tighten the Powrcel Clamp Screw to 100 foot pounds, Figure I-48. The clamp screw must be tightened to 100 foot pounds to insure a tight seal between the Powrcel Body and the cylinder head, and between the Powrcel Cap and Body.

IMPORTANT Failure to remove all carbon from the exterior of the Powrcel and from the cylinder head recess may prevent a seal from being formed and will not permit the Powrcel Body to be positioned correctly. Leakage between the Powrcel and the cylinder head will cause poor combustion in that cylinder and will result in irreparable damage to the powrcel and possibly to the cylinder head.



Figure I-48. Tighten Powrcel Clamp Screw with Torque Wrench

Cleaning Powrcel Assembly

- 1. Clean all carbon out of the funnel shaped end cavities of the Powrcel with a hard wood stick or a soft metal (brass) carbon scraper shaped to conform with the cavities.
- 2. Clean all carbon out of the front orifice of the Powrcel, Figure I-46, using a properly shaped piece of hard wood that is soaked in diesel fuel. DO NOT use a drill, reamer or any metal tool.

USE CARE WHILE CLEANING A POW-ERCEL NOT TO CHANGE OR DAMAGE THE CONTOURS OF THE POWRCEL IN ANY MANNER.

- 3. Use a Brass Wire Brush provided in the CD 500 or CD 800 Tool Kit to clean all carbon from the exterior of the Powrcel parts.
- 4. Wash all of the Powrcel parts in Bendix Speed Clene, carbon tetrachloride or a similar carbon solvent.
- 5. The lapped surfaces of the Powrcel Cap and Body that form a seal must be CLEAN-ED on a lapping plate with clean mutton tallow. DO NOT USE LAPPING COMPOUND.
 - a. Wipe the surface of the lapping plate with a clean soft cloth.



Figure I-49. Cleaning Powrcel Body on a Lapping Plate

- b. Smear clean mutton tallow evenly on the lapping plate. Use enough so there is no danger of a dry surface contacting the lapped surfaces. Smear a thin film of tallow on the lapped surfaces of the Powrcel Cap and Body.
- c. Hold the Powrcel part so even pressure will be exerted on the entire surface. Use just enough pressure to insure contact.