DESCRIPTION AND OPERATION

ENGINE

Engine Description

The 6.4L diesel engine:

- is a 4-cycle turbocharged V-8 with overhead valves.
- has a 6.4L (390 cu in) displacement.
- has 2 separate banks, the right bank is numbered 1, 3, 5, 7 and the left bank is numbered 2, 4, 6, 8.
- has a cylinder block design that consists of:
  - a 2-piece crankcase.
  - internal piston cooling oil jets.
  - a forged steel crankshaft.
  - powered metal, cracked connecting rods.
- has pistons that are:
  - made of an aluminum alloy.
  - fitted with an upper keystone compression ring.
  - fitted with a lower rectangular compression ring.
  - fitted with oil control rings.
- has piston pins that are:
  - free-floating design.
  - retained by piston pin retainers.
- has a camshaft that is:
  - supported by 5 insert-type camshaft bearings.
  - roller camshaft design.
  - driven by the crankshaft through the use of the crankshaft gear and the camshaft gear.
- has hydraulic valve tappets that:
  - minimize engine noise.
  - maintain zero valve lash.
  - incorporate camshaft follower guides.
  - incorporate a roller follower design that reduces camshaft wear.
- has a cylinder head design that:
  - incorporates piezo-actuated fuel injectors.
  - locates the fuel injectors in the center of the combustion chambers between the rocker arms.
  - has external low pressure fuel return galleries.
- has an optional block heater that is:
  - designed to heat the engine coolant and oil for improved cold weather starts.
  - located near the starter.
  - powered by a 120-volt external power source.
  - replaceable, but not repairable.

- has an engine lubrication system that:
  - is cooled by an engine oil cooler.
  - utilizes an Engine Oil Pressure (EOP) switch, an oil pressure regulator and an Engine Oil Temperature (EOT) sensor.
  - uses a gerotor oil pump driven by the crankshaft.
- has exhaust manifolds that:
  - are a cast iron design.
  - use an exhaust manifold gasket.
  - routes exhaust gases from the engine block to the turbocharger inlet pipes.
- has an oil pan:
  - that is a 2-piece design.
  - contains an oil baffle that is located in the upper oil pan.
  - has the pickup tube mounted to the upper oil pan.
- has an intake manifold:
  - that is a 1-piece cast aluminum design.
  - has an EGR adapter mounted to it.

The 6.4L diesel engine is of a 4-stroke design. The 6.4L diesel utilizes 2 turbochargers and a high pressure common rail fuel injection system. The 6.4L diesel is designed to meet the government mandated emission standards.

Engine Identification

Always refer to these labels when installation of new parts is necessary, or when checking engine calibrations. The engine parts often differ within a CID family. Verification of the identification codes will make sure that the correct parts are obtained. These codes contain all the pertinent information relating to the dates, optional equipment and revisions. The Ford Catalog Advantage™, or equivalent, contains a complete listing of the codes and their application.

Engine Code Information Label

The engine code information label is located on the front of vertical EGR cooler, contains the following:

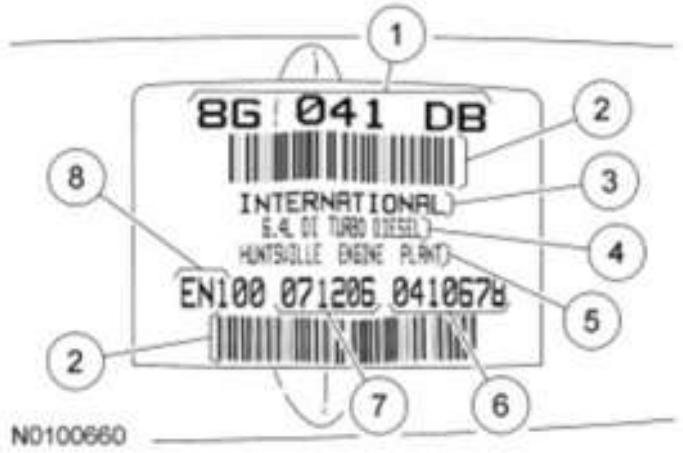

Fig. 1: Identifying Engine Code Information Label

Courtesy of FORD MOTOR CO.

ITEM DESCRIPTION CHART

Item	Description
1	Engine part number
2	Bar code
3	Engine manufacture
4	Engine displacement
5	Engine build location
6	Engine serial number
7	Engine build date (DDMMYY)
8	Engine build location

Emissions Label

The engine code information label, is located on the left side rear valve cover, contains the following:

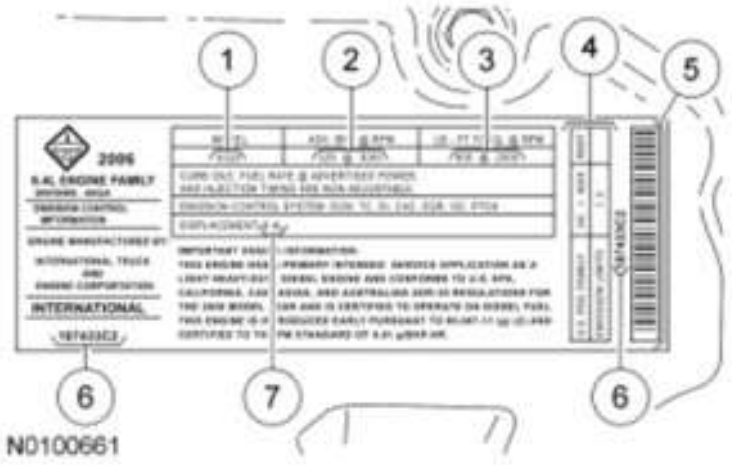

Fig. 2: Identifying Emissions Label
Courtesy of FORD MOTOR CO.

ITEM DESCRIPTION CHART

Item	Description
1	Model number
2	Engine horsepower rating
3	Engine torque rating
4	Emission identification
5	Bar code
6	Label part number (International®)
7	Engine displacement

Engine Serial Number Label

The serial number label is located on the left rear of the cylinder block, contains the following:

NOTE: **Under the sticker the engine serial number is also etched into the cylinder block.**

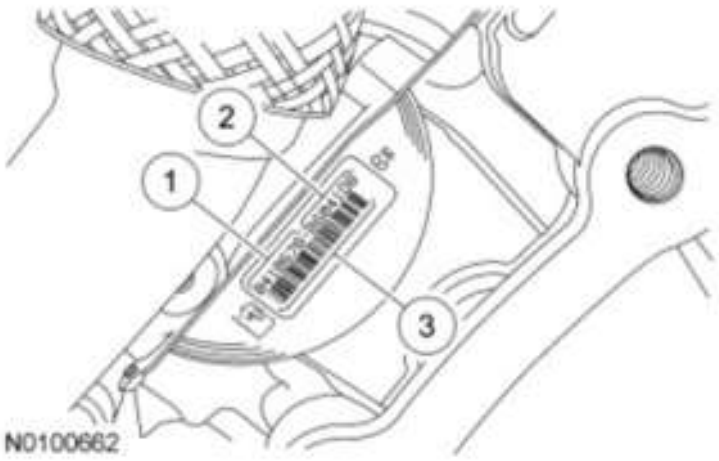

Fig. 3: Identifying Engine Serial Number Label
Courtesy of FORD MOTOR CO.

ITEM DESCRIPTION CHART

Item	Description
1	Engine serial number
2	Engine part number
3	Bar code

Oil Requirements

The 6.4L diesel engine may be operated over a wide range of operating conditions. It is important to match the viscosity of the engine oil to the vehicle operating conditions. Use the following statements and chart to make sure the oil viscosity chosen is compatible with the expected vehicle operating conditions.

- The heavier oils 15W-40 and 5W-40 are recommended for temperatures over 10°C (50°F) and must be used for heavy duty driving and trailer towing.
- An engine block heater must be used at temperatures below -23°C (-10°F).
- Use the same engine oil and filter change intervals when using synthetic engine oil.
- Use Motorcraft® oil or equivalent oil conforming to Ford specification WSS-M2C171-E or API service categories CJ-4 or CJ-4/SM.

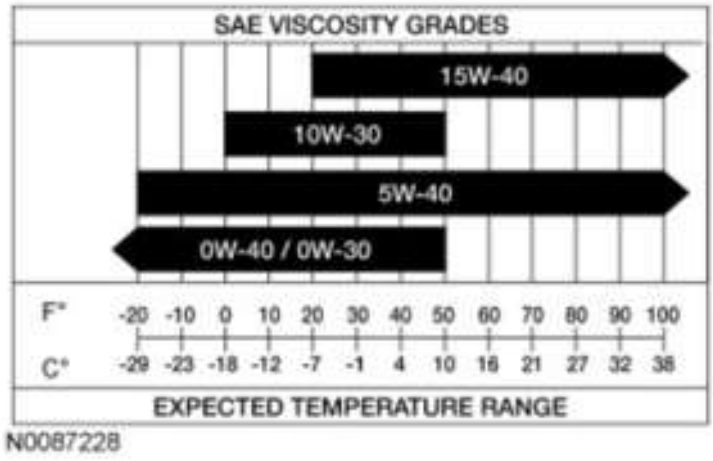

Fig. 4: Oil Viscosity Chart
Courtesy of FORD MOTOR CO.

Engine Cylinder Identification

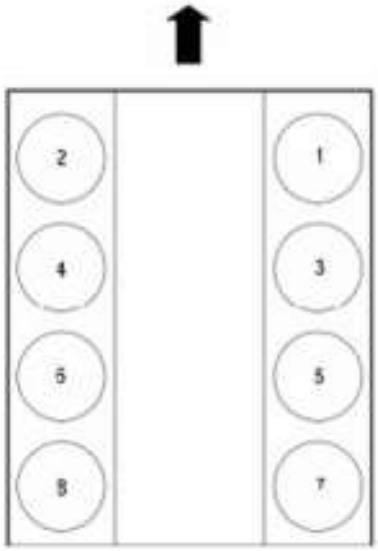

Fig. 5: Identifying Engine Cylinder Identification
Courtesy of FORD MOTOR CO.