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# DIESEL TRACTORS & their fuels

University of Illinois • College of Agriculture  
Extension Service in Agriculture and Home Economics  
Circular 735

## A DIESEL ENGINE

has a compression ratio which is much higher during the intake stroke and compressed on temperature rises above the ignition point of dead center, the injection pump forces fuel in. Since the temperature is above the fuel's self-igniting point, the fuel ignites, producing heat and power.

### **Do Diesels have good lugging ability?**

Yes, Diesels are noted for their lugging ability — or ability to hang on and pull through extremely tough spots even when the speed has been pulled down by a heavy load.

### **How do Diesel and gasoline tractors compare in fuel economy?**

Diesels are more efficient than gasoline engines, especially at light loads. This is because the compression pressure in a Diesel always remains just as high at part load as at full load. Any tractor, however, is most efficient when operated at or near rated load.

### **How do they compare in upkeep costs?**

There should be little if any difference between Diesel and gasoline tractors in the long-time costs of maintenance and repair — provided the tractors are properly cared for. Diesel engines need overhauling less often but the job usually costs more. Follow your owner's manual in caring for your tractor.

### **What is the correct operating temperature?**

Recommendations differ — consult your owner's manual. Always bring a Diesel tractor up to temperature before applying a heavy load. Never let a cold engine run at slow idling speed in cold weather. Always allow a hot engine to idle a few minutes before you shut it off.



an that of a gasoline engine. Only air is drawn in compression stroke. As the air is compressed, the fuel. When the piston is a few degrees below top the combustion chamber under extremely high pressure point, the fuel starts to burn immediately, gen-



### Will constant overloading harm Diesels?

Yes, it will shorten the life of the engine. Neither Diesel nor gasoline engines should be overloaded for long periods. Bearings and all other parts are designed for a specific maximum load.

### What causes smoking?

Light black smoking at the exhaust is normal for most Diesel tractors. Heavy smoking can be caused by overloading, dirty air cleaner, faulty fuel injection, or any condition which keeps the fuel from being completely burned.

### What is an objectionable knock?

A knock when the engine is running idle is characteristic of a Diesel. A knock under load, however, means that something is wrong. The cause may be too much clearance in main or connecting rod bear-

ings, faulty ignition qualities in the fuel, restricted air flow, or improper timing.

### What causes air locking?

Air locking is caused by an empty fuel tank or by loose or broken fuel lines. To correct it, bleed the line and tighten the fuel connections.

### What are some signs of faulty operation of the injection system?

A smoking exhaust at light or medium loads, hard starting, loss of power, misfiring, and overheating often result from trouble in the injection system. In the event of any of these difficulties, consult your local dealer.

### Is idling harmful?

Slow idling can harm a Diesel. Ask your dealer for the correct idling speed of your engine.

### Can kerosene be used in Diesel tractors?

Some Diesel engines, but not all, will operate satisfactorily on kerosene. Since kerosene offers no particular advantage over Diesel fuel, however, and is usually more expensive, there's no point in using it, except possibly in emergency. Before an emergency arises, find out from your dealer whether it is all right to use kerosene in your tractor.

### Can gasoline be used?

No—never burn gasoline alone nor let the least bit get into your fuel. Gasoline lacks the lubricating quality of Diesel fuel. Burning even a small amount may cause loss of power, vapor lock, and wear of the injection system.



### Should a different fuel be used in winter than in summer?

It may be necessary to use lighter fuels in cold weather. Consult your owner's manual for the manufacturer's recommendation.

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### How can I be sure I'm using the right fuel?

Consult your implement dealer for the latest recommendations, and buy, from a reputable supplier, fuel that meets the specifications.

### Why must Diesel fuel be kept clean?

A minute particle of dirt can seriously damage the injection equipment, which has extremely close-fitted parts. Since this equipment is the heart of a Diesel engine, repairs to it can be very expensive. Diesel tractors are well equipped with screens and filters, but anything you can do to lessen their work will help prevent damage to the injection system.

### What happens if water gets into the fuel?

Water may seriously damage the injection equipment and may also clog the filters. If there is water in the fuel, there is also more chance that the fuel contains dirt. Keep tanks filled as much as possible, drain water traps regularly, and be careful not to draw fuel directly from the bottom of the tank.

### What does the color of Diesel fuel indicate?

Some oil companies tint their Diesel fuels for identification purposes. When this is done, a harmless dye is used.



Color of fuel makes no difference

### Is Diesel fuel storage hazardous?

Diesel fuel does not present as much of a fire hazard as gasoline. It is not explosive and will not burn in the open unless atomized or heated to a high temperature. Any fuel storage, however, creates a fire hazard, and you need to keep rags, leaves, straw, or other easily ignited material away from the area.

### How should I store Diesel fuel?

First, use only one tank — storage in drums is not satisfactory — and make sure the tank is clean. It should be in a shady spot where temperatures will



vary as little as possible. This will keep moisture condensation at a minimum. The fuel outlet should be a few inches above the bottom. After filling the storage tank, let the fuel settle before refueling the tractor. Pump fuel directly from storage to the tractor tanks — never use open containers.

### What type of crankcase oil should I use?

Your implement dealer will have the latest recommendations of the manufacturer. Most manufacturers recommend the oils marked for service "DS" or "DS."

### Does black crankcase oil mean trouble?

Not necessarily. Additives in the oil keep in suspension the small particles of fuel soot and products of decomposed oil and fuel. Otherwise, these materials collect in the ring grooves and on the rings, causing them to stick. Darkening of the oil therefore does not necessarily mean that the oil is changing. Change oil according to instructions in your owner's manual.

(Prepared by Wendell Bowers and G. E. Pickard)